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SCREENING SITE INSPECTION REPORT
FOR
KENT COUNTY PLAINFIELD LANDFILL
AKA 10 MILE ROAD LANDFILL/
NORTH KENT LANDFILL
U.S. EPA ID: MID000265066
SS ID: NONE
TDD: F05-8711-063
PAN: FMI0310SB

APRIL 19, 1990

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International Specialists in the Environment

SIGNATURE PAGE
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1. INTRODUCTION

Ecology and Environment, Inc., Field Investigation Team (FIT) was tasked by the United States Environmental Protection Agency (U.S. EPA) to conduct a screening site inspection (SSI) of the Kent County Plainfield Landfill (KCPL) site under contract number 68-01-7347.

The site was initially discovered by the Michigan Department of Natural Resources (MDNR). The site was discovered by MDNR in May 1983, when contamination was discovered in monitoring wells and the underdrain outfalls on-site.

The site was evaluated in the form of a preliminary assessment (PA) that was submitted to U.S. EPA. The PA was prepared by Lisa Perenchio of Ecology and Environment, Inc. (E & E), on March 17, 1983.

FIT prepared an SSI work plan for the KCPL site under technical directive document (TDD) F05-8711-063, issued on November 23, 1987. The SSI work plan was approved by U.S. EPA on September 16, 1988. The SSI of the KCPL site was conducted on October 25 and 26, 1988, under amended TDD F05-8711-063, issued on September 16, 1988.

The FIT SSI included an interview with a site representative, a reconnaissance inspection of the site, and the collection of 10 soil samples, 5 residential well samples, and 8 monitoring well samples.

The purposes of an SSI have been stated by U.S. EPA in a directive outlining Pre-Remedial Program strategies. The directive states:

> All sites will receive a screening SI to 1) collect additional data beyond the PA to enable a more refined preliminary HRS [Hazard Ranking System] score, 2) establish priorities among sites most likely to qualify for the NPL [National Priorities List], and 3) identify the most critical data requirements for the listing SI step. A screening SI will not have rigorous data quality objectives (DQOs). Based on the refined preliminary HRS score and other technical judgement factors, the site will then either be designated as NFRAP [no further remedial action planned], or carried forward as an NPL listing candidate. A listing SI will not automatically be done on these sites, however. First, they will go through a management evaluation to determine whether they can be addressed by another authority such as RCRA [Resource Conservation and Recovery Act].... Sites that are designated NFRAP or deferred to other statutes are not candidates for a listing SI.
>
> The listing SI will address all the data requirements of the revised HRS using field screening and NPL level DQOs. It may also provide needed data in a format to support remedial investigation work plan development. Only sites that appear to score high enough for listing and that have not been deferred to another authority will receive a listing SI. (U.S. EPA 1988)

U.S. EPA Region V has also instructed FIT to identify sites during the SSI that may require removal action to remediate an immediate human health or environmental threat.

2. SITE BACKGROUND

2.1 INTRODUCTION

This section includes information obtained from SSI work plan preparation and the site representative interview.

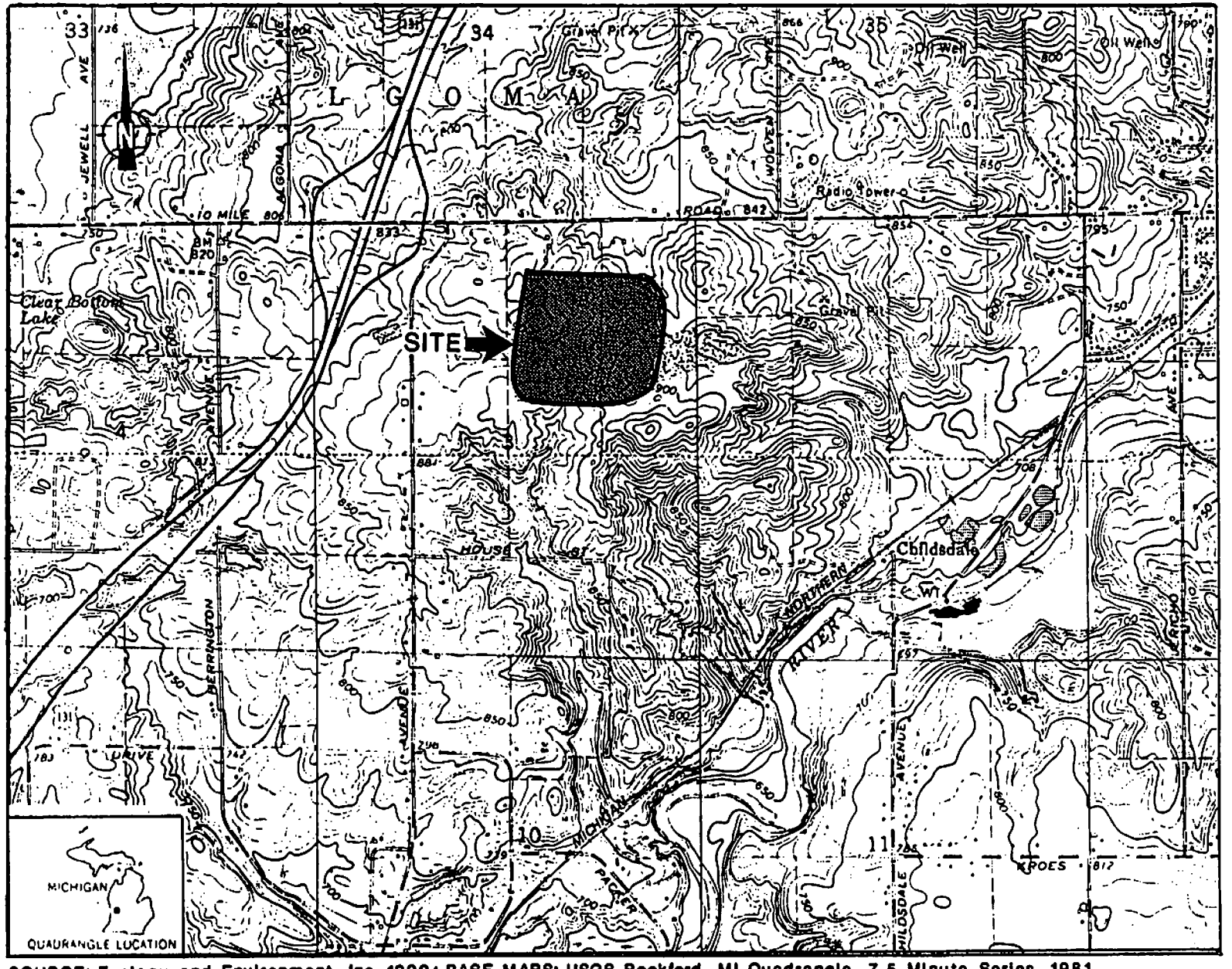
2.2 SITE DESCRIPTION

The KCPL site is an inactive municipal landfill that has been closed since December 31, 1986. The site is composed of 54 acres of fill on a 345-acre property located about 3/4 miles west of the city limits of Rockford, Michigan, in Kent County (NE1/4 sec. 3, T.8N., R.11W.) at 2908 10 Mile Road (see Figure 2-1). A 4-mile radius map of the KCPL site is provided in Appendix A.

2.3 SITE HISTORY

The KCPL site began operations on April 19, 1976, when its application for a solid waste disposal area license was approved by MDNR under Act 87, Public Acts of 1965. Robert H. Scott, of the Kent County Department of Public Works (KCDPW), was the operator of the site. The solid waste disposal area license allowed the landfill to accept general refuse, garbage, rubbish, and industrial waste.

Prior to MDNR approval of the site, a great deal of opposition to the proposed location of the landfill had occurred. In August 1974, the Western Michigan Environmental Action Council (WMEAC) expressed concern over the proximity of private wells to the site, the possible degradation of seven natural springs that originate on-site and enter the Rogue River, the problems associated with dewatering the site due to its



SOURCE: Ecology and Environment, Inc. 1990; BASE MAPS: USGS Rockford, MI Quadrangle, 7.5 Minute Series, 1981.

SCALE

0 ½ 1 MILE

FIGURE 2-1 SITE LOCATION MAP

high water table, and the possible problems associated with methane gas production (Dauphin 1974).

In September 1975, MDNR prepared a statement that addressed the environmental impacts that the landfill would have on the surrounding area. The statement called for several engineered modifications to the site because the site was unsuitable in its natural state to support a landfill (Tanner 1975).

On December 5 and 6, 1975, the Grand Rapids Press ran two articles concerning the proposed site that stated that all of the necessary engineering modifications to the site would make the cost of operating the site too high. Public hearings were also taking place around the time the articles ran (Beck 1975). The results of these hearings were published in a report by MDNR in March 1976. The report concluded that..."the proposed landfill as designed is likely to pollute, impair, or destroy the ground or surface waters of the State." The report also listed several additional requirements to the engineering plans and specifications that, if undertaken, would allow MDNR to grant a license to the landfill (Fulkerson 1976).

Following MDNR's issuance of a license to the site in April 1976, the site was granted authorization to discharge under the National Pollutant Discharge Elimination System (NPDES) in June 1976. This permit covered discharges of excess water (caused by the high water table at the site) to unnamed tributaries of the Rogue River. This permit also covered aspects of leachate control and groundwater monitoring wells (Courchaine 1976).

After all of the required engineered modifications were implemented, the site officially opened on June 1, 1977. In December 1977, the disposal of inorganic sludges from electroplating industries began in one of the landfill cells (Despres 1977).

In May 1978, the Plainfield Township Supervisor wrote a letter to the Attorney General in Michigan, explaining his concerns over the disposal of contaminated waste from the bankrupt Story Chemical Company at the KCPL site. The site was apparently unlicensed from 1977 to 1978 for not meeting its stipulated permit requirements (Lamoreaux 1978). MDNR personnel who had approved the disposal of Story Chemical waste at the site were unaware of the lack of an operating license. Waste from Story

Chemical contained crushed empty barrels, wooden pallets, and sand slightly contaminated with organic solvents such as toluene and xylene. These wastes were believed to be nonhazardous (Miller 1978).

In February 1979, KCDPW signed an agreement with MDNR and the Michigan Attorney General to carry out several design modifications in order to have its license renewed (Tanner 1979). The site operator during this period was Curt Kemppainen, of KCDPW.

In March 1979, leachate from the site was hauled to a sanitary sewer just south of Rockford (Kemppainen 1979). In September 1979, KCDPW was notified by the city of Grand Rapids that analysis revealed that several of the parameters in the leachate discharged to the sewers were in violation of the city ordinance for direct discharge to the city sewer system (Biener 1979). Also in September 1979, blockages in the leachate collection system caused some of the parameters specified for the underdrain outfalls in the NPDES permit to be exceeded (Kemppainen 1979a).

In January 1980, the leachate lagoon on-site overflowed its banks, releasing approximately 2,500 to 3,000 gallons of leachate to the surrounding environment (Heyt 1980). In May 1980, KCDPW requested permission from MDNR to reintroduce leachate into the top of the landfill. This request was made because the Grand Rapids Wastewater Treatment Plant could not handle the high concentrations of heavy metals in the leachate being discharged to the sewer (Lamancusa 1980). On May 28, 1980, MDNR granted approval for reintroduction of leachate into the landfill.

Between 1979 and 1980, the KCPL site received foundry sand and sludge from an assortment of industries, possibly including George Belfer Drum and Barrel Company, American Seating, G. M. Diesel Equipment Division, Keeler Brass, Blackmer Pump Division, and Wolverine Brass Works (Kamps 1980). The site representative indicated that sludge from several of these companies was not accepted at the landfill because it did not meet EPA EP toxicity standards (Powell 1988). Lee Bartlett became the site operator around the beginning of 1980.

In June 1981, Michigan Waste Systems, Inc., a waste transporter for the site, filed a 103(c) Notification of Hazardous Waste Site form with U.S. EPA. This form listed the types of wastes present on-site,

including organics, inorganics, heavy metals, mixed municipal waste, paint sludges, and metal grindings. The sources of wastes listed on the notification form included construction, paper/printing, leather tanning, iron/steel foundry, plating/publishing, sanitary refuse, laboratory/hospital, painting operations, and metal working. According to the site representative, all industrial wastes accepted at the site underwent EP toxicity tests that showed the waste to be nonhazardous according to EPA standards.

In February 1982, the Plainfield Township Supervisor officially protested the reissuance of the NPDES permit based on continuous violations of the previous permit (Lamoreaux 1982). In April 1982, the site began accepting petroleum-contaminated wastes, such as soil contaminated with diesel fuel (Bartlett 1982).

In May 1983, as a result of the discovery of contamination of on-site monitoring wells and underdrain outfalls with a variety of chlorinated organic compounds and organic solvents, the site owners were ordered by MDNR to stop reintroducing leachate into the landfill (Przybysz 1983). In August 1983, WMEAC held a press conference to inform the public of the groundwater contamination problems in the area of the KCPL site (Ruswick 1983).

In September 1983, MDNR called for the site owners to develop a remedial action plan to address contamination of the underdrain outfalls and groundwater, and for physical closure of the site (Heyt 1983). In February 1984, MDNR was calling for closure of the site by March 1, 1984, but KCDPW requested that the site be allowed to remain open until June 1987 (Roelofs 1984).

In September 1984, around the time that leachate treatment at the site began, a sample of untreated leachate was analyzed by KCDPW. The analysis revealed chlorinated organic compounds and organic solvents similar to those that had been detected in previous leachate tests, but polyaromatic hydrocarbons and phenols were also detected (Lamancusa 1984). Around this time, Jerry Powell of KCDPW took over as operator of the site.

In January 1985, KCDPW was issued a Notice of Noncompliance by MDNR for problems, including those associated with groundwater contamination, leachate levels, and the use of the underdrain basins (Despres 1985).

In April 1985, a complaint from the public was documented concerning odor problems at the site. Odor at the site had been a source of recurring complaints when warm weather set in every year. This complaint was made by a local resident and her congressman, who was present at her house at the time the complaint was registered (Przybysz 1985).

In June 1985, MDNR issued a notice denying reissuance of the solid waste disposal permit to KCDPW (Skoog 1985). Because testing of monitoring wells and underdrain outfalls continued to show contamination, residential well testing began in the area of the site. In September 1985, a nearby residential well was found to contain levels of nitrates above those allowed by the state. In November, another nearby residential well was found to be contaminated with very low levels of 1,1,1-trichloroethane (Winchester 1985). In February 1986, repeat testing of this well showed no 1,1,1-trichloroethane, but the resident was advised not to drink or cook with her water until further testing was done (Winchester 1986). A week later, another letter to the resident stated that the levels previously detected should not cause any problems (Winchester 1986a). In September 1986, re-testing of this well detected 1,1,1-trichloroethane, and levels of nitrates above the levels allowed by the state. No other area residential wells showed any signs of contamination (Reading 1986).

In October 1986, MDNR and KCDPW signed a Closure Agreement to terminate operation of the landfill as of December 31, 1986. In April 1987, a landfill gas control plan was developed by KCDPW to collect the large amounts of methane produced by the landfill and burn it in a flaring unit (Powell 1987). A construction permit has been issued but the system had not been installed as of October 1988.

Residential well and monitoring well sampling has continued since the closure of the site. At the time of its closure, the site had reached a final capacity of approximately 1.75 million tons. Currently, three full-time employees are on-site to oversee the operation of the on-site wastewater (leachate) treatment trailer and the general maintenance of the landfill. The site is completely capped, and tanker trucks continue to remove the treated leachate from the site to the Grand Rapids Wastewater Treatment Plant. The sludge cake generated from

wastewater treatment is disposed of at the South Kent Landfill, which is also owned by KCDPW. According to the site representative, this sludge cake has been classified by MDNR as nonhazardous.

3. SCREENING SITE INSPECTION PROCEDURES AND FIELD OBSERVATIONS

3.1 INTRODUCTION

This section outlines procedures and observations of the SSI of the KCPL site. Individual subsections address the site representative interview, reconnaissance inspection, and sampling procedures. Rationales for specific FIT activities are also provided. The SSI was conducted in accordance with the U.S. EPA-approved work plan.

U.S. EPA Potential Hazardous Waste Site Inspection Report (Form 2070-13) for the KCPL site is provided in Appendix B.

3.2 SITE REPRESENTATIVE INTERVIEW

Stephen Bunsen, FIT team leader, conducted an interview with Jerry J. Powell, P.E., of KCDPW, who is the current operator of the site. The interview was conducted on October 25, 1988, at 9:15 a.m. in an office at the site. The interview was conducted to gather information that would aid FIT in conducting SSI activities.

3.3 RECONNAISSANCE INSPECTION

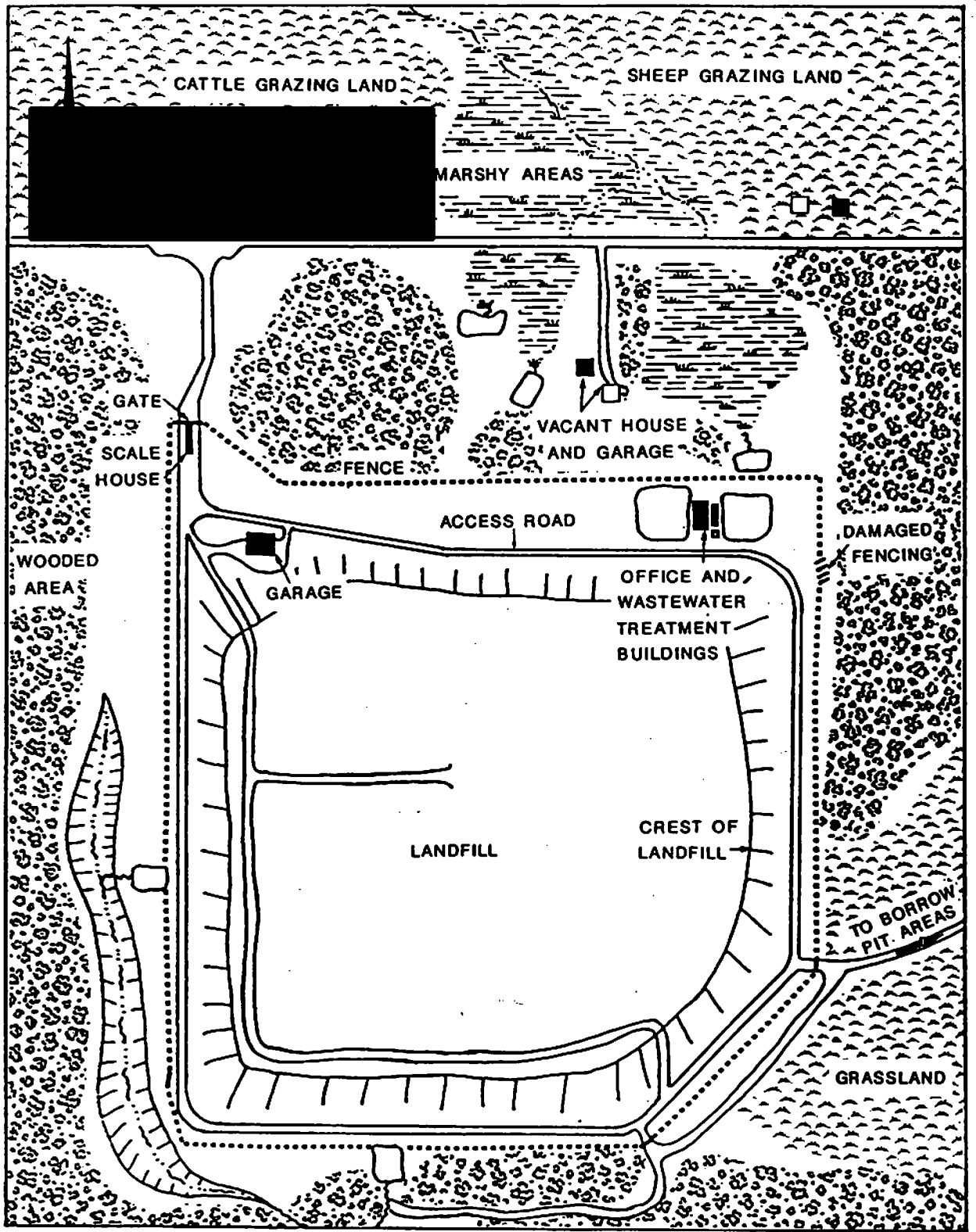
On October 25, 1988, at 10:30 a.m., FIT conducted a reconnaissance inspection of the KCPL site and surrounding area in accordance with E & E health and safety guidelines. The reconnaissance inspection included a walk-through of the site to determine appropriate health and safety requirements for conducting on-site activities and to make observations to aid in characterizing the site. FIT also determined sampling locations during the reconnaissance inspection. Powell accompanied FIT during the reconnaissance inspection.

Reconnaissance Inspection Observations. The KCPL site is located in a moderately populated area composed of rural properties, small businesses, and residential neighborhoods. The site is located approximately 1/4 mile east of U.S. Highway 131 and 3/4 miles west of the Rockford, Michigan, city limits. The Rogue River winds around the area of the site, surrounding it in every direction except southwest. At its closest point, the river runs approximately 3/4 miles southeast of the site. The river is separated from the site to the southeast by areas of higher elevation. The town of Belmont, Michigan, lies approximately 2 miles south of the site. The Rogue River flows through Belmont and enters the Grand River approximately 3 1/4 miles south of the site. There are approximately 250 acres of orchards within a 3-mile radius of the site, and the topography of the area is gently rolling to steeply sloped.

The site itself is composed of 54 acres of actual fill area situated on 345 acres of property. Approximately 200 acres of the site has been designated for development as a county park. The site is surrounded by wooded areas on all sides except the southeast, where the borrow pits were dug for clay used in site operations (see Figure 3-1 for site features). This area is now a grassland but vegetation in some spots has not yet grown back.

The area east of the site is composed of the borrow pits and undeveloped woodland belonging to the county. [redacted] Several residences are located north of the site, across 10 Mile Road. There is an Amoco gas station at the corner of Belmont and 10 Mile Road and an antique furniture store located to the north of the gas station.

Directly north of the landfill area across 10 Mile Road are two areas of grazing land, which are bisected by a small stream that receives water from the underdrain outfalls on-site. The parcel of land east of the stream is used for sheep grazing and the parcel west of the stream is used for cattle grazing. A marshy area surrounds the stream. According to the site representative, landowners of the parcels both



SOURCE: Ecology and Environment, Inc. 1990.

SCALE

0 500 1000 1,500 FEET

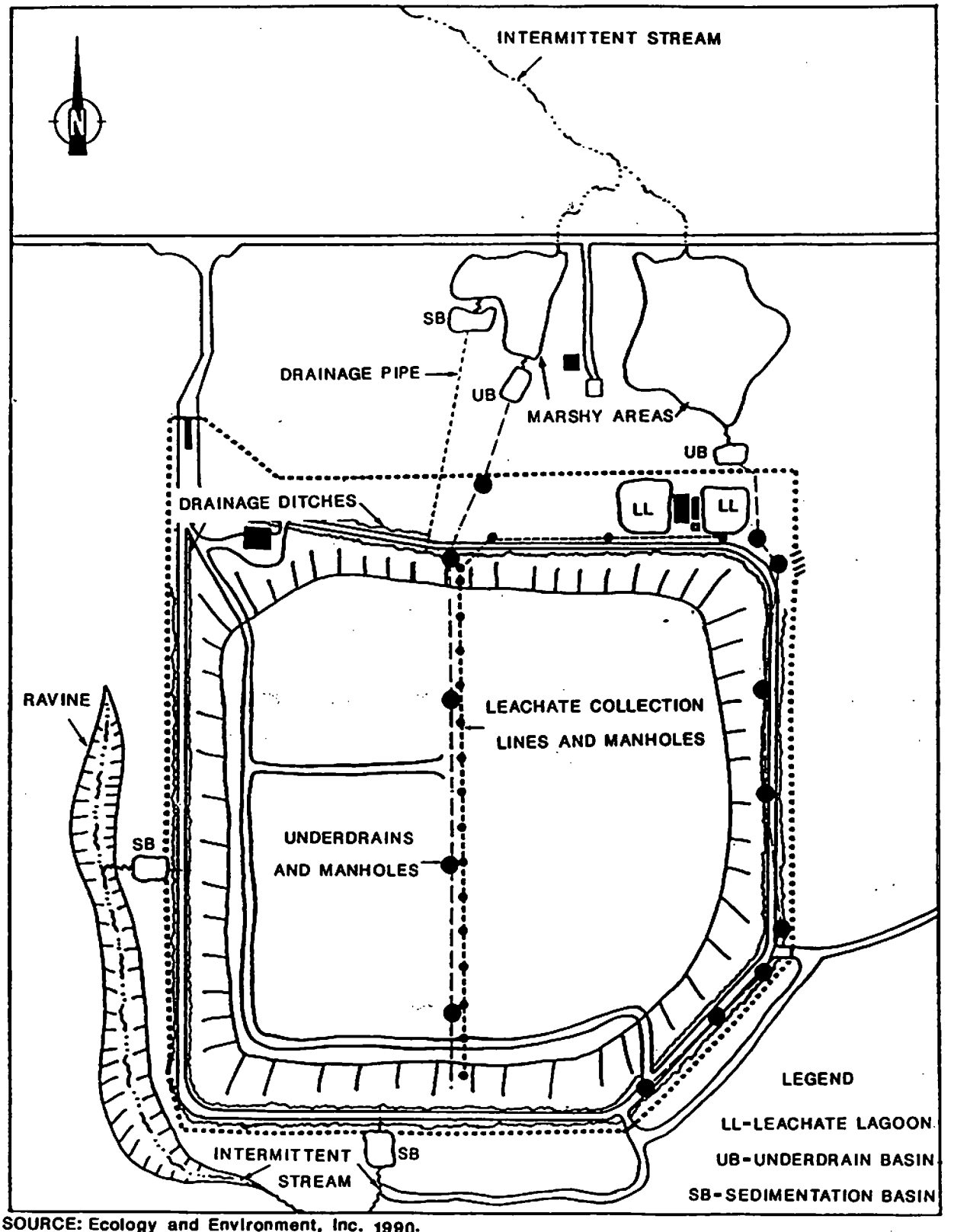
FIGURE 3-1 SITE FEATURES

east and west of the stream have been warned by site representatives not to allow their livestock to drink from the stream, but no fence exists to prevent the animals from doing so. Sheep were observed by FIT at this location.

Two marshy areas just north of the landfill have been created by water from the underdrain outfalls. Each outfall discharges into a small basin, then flows into the marshy areas before converging on the other side of 10 Mile Road to form the small stream (see Figure 3-2 for site drainage features). FIT observed an old, vacant house and garage located between these two marshy areas. Both underdrain basins are located outside the site's fencing and both contained an orange bubbly foam under the drain as well as oily films on the water surface. Orange stains, apparently iron oxide, were present along the banks of both basins. These stains could be traced along the outfalls and across 10 Mile Road.

Three sedimentation basins exist on the north, west, and south sides of the landfill. The northern sedimentation basin drains into the same marshy area as the center underdrain basin. A drainage pipe conveys eroded sediment to this basin from ditches that surround the landfill. The western and southern sedimentation basins are present within intentional breaks in the fencing. Access to the site would be possible only by going through the sedimentation basins. According to the site representative, these sedimentation basins are dredged periodically when they become too full of eroded sediments. Along the southwest edge of the site, FIT observed a deep ravine into which the western sedimentation basin drains. FIT also observed two leachate lagoons in the northeast corner of the landfill area.

A fence completely surrounds the site except for the breaks near each sedimentation basin. FIT observed one small area near the northeast corner of the site where the fencing had been knocked down. The site representative stated that deer do manage to get inside the fence somehow, and a deer was observed by FIT outside the fence near the underdrain basins. A paved access road surrounds the landfill just inside the fence. Connecting dirt access roads lead back to the borrow pit areas and up onto the western and southern crests of the landfill.



SOURCE: Ecology and Environment, Inc. 1990.

FIGURE 3-2 SITE DRAINAGE FEATURES

An access road also leads to the leachate manholes visible along the middle of the landfill.

Three buildings are present on-site along the northern edge of the landfill. A small scale house is located at the front gate and is used to weigh trucks entering and leaving the site. A vehicle and equipment storage garage is located at the northwest corner of the landfill. The offices and wastewater treatment buildings are located at the northeast corner of the landfill, in between the two leachate lagoons. The actual wastewater treatment machinery is housed in a truck trailer adjacent to this building.

The leachate treatment system is operated by adding caustic soda to the raw leachate from the eastern (untreated) lagoon to precipitate the metal hydroxides out of solution. These hydroxides form a sludge that falls off the filter press into a dumpster at the end of the trailer. The treated wastewater is pumped to the western lagoon, where tanker trucks routinely remove this water to the Grand Rapids Wastewater Treatment Plant. Each lagoon has a 500,000-gallon capacity. The raw leachate lagoon has a Hyphalon liner, whereas the treated leachate lagoon has only a clay liner. On the raw leachate lagoon, FIT observed a thick but noncontinuous, multicolored scum on the surface. This scum is apparently the result of a foam that was sprayed on the surface of the pond in the summer to control odors. No such scum exists on the treated leachate lagoon, which merely looked cloudy. A monitoring well (MW62) is located just north of this lagoon. Water from this well has been found, over the history of the site, to be very contaminated. Water from monitoring well MW62 is pumped 10 hours per day into the lagoon to be transported, along with the treated leachate, to the Grand Rapids Wastewater Treatment plant.

Numerous leachate outbreaks were observed by FIT at various locations on the slopes of the landfill. The soil is stained orange at these locations and vegetation is stressed. These apparent iron oxide stains are present both in areas where leachate is present or in areas of past leachate seeps.

The cap on the landfill is generally in very good condition, but some areas on the top of the landfill are only sparsely vegetated. Ground-nesting birds were observed by FIT on the top of the landfill.

Gas fields are present in several different areas of the landfill and, at some, the pressure is very strong. The leachate manholes that run on a north-south line across the middle of the landfill also serve as methane vents. Due to the cold weather during the SSI, the warm vapor from the methane gas vents was clearly visible. A large water tank was located near the leachate manholes. The water in the tank was used to spray down divers that were sent down into the manholes to remove blockages that built up in the leachate collection lines. These blockages occur when calcium carbonate and iron form a precipitate which clogs the lines. The total depth of fill at the manholes is approximately 95 feet, according to the site representative, and the slope of the landfill is 4:1 (Powell 1988).

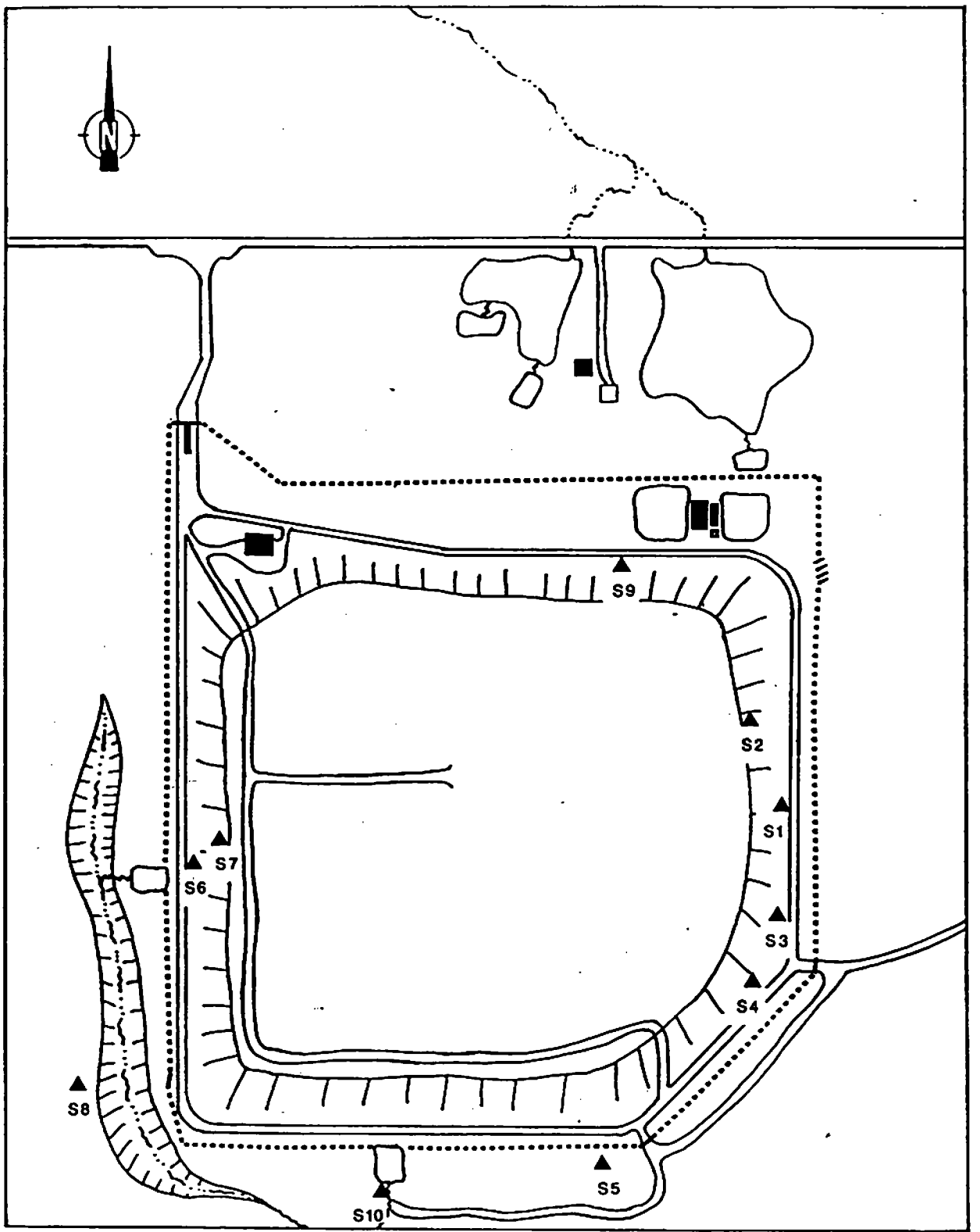
There are approximately 30 monitoring wells present on-site, 8 of which were sampled by FIT. All of the monitoring wells sampled by FIT were 4-inch diameter wells except for monitoring well TW03, which was a 2-inch diameter well. Photographs of the KCPL site are provided in Appendix C.

3.4 SAMPLING PROCEDURES

Samples were collected by FIT at locations selected during the reconnaissance inspection to determine whether U.S. EPA Target Compound List (TCL) compounds and U.S. EPA Target Analyte List (TAL) analytes were present at the site. The TCL and TAL, with corresponding quantitation/detection limits, are provided in Appendix D.

On October 25, 1988, FIT collected 10 soil samples and 5 residential well samples. On October 26, 1988, FIT collected 8 monitoring well samples. Portions of all samples collected by FIT were offered to, and accepted by, site representatives.

Soil Sampling Procedures. Ten soil samples (designated as S1 through S10) were collected to determine whether TCL compounds and TAL analytes were present on-site. Soil samples S5 and S8 were collected as potential background samples. Sample S5 was collected from a wooded area just south of the fence that surrounds the landfill (see Figure 3-3 for soil sampling locations). Sample S8 was collected from a wooded area just west of the ravine that runs along the southwest side of the



SOURCE: Ecology and Environment, Inc. 1990.

SCALE

0 500 1000 1,500 FEET

FIGURE 3-3 SOIL SAMPLING LOCATIONS

site. These samples were collected to determine the representative chemical content of the soil in the area surrounding the site.

Soil samples S1, S2, S4, and S7 were collected from leachate seeps at various locations around the landfill to determine whether TCL compounds and TAL analytes were being carried to the surface. Soil samples S3, S6, and S9 were collected from drainage ditches around the landfill to determine whether TCL compounds and TAL analytes were migrating from the landfill via surface runoff. Soil sample S10 was collected from the southern sedimentation basin to determine whether TCL compounds and TAL analytes were migrating from the landfill and into the surrounding environment.

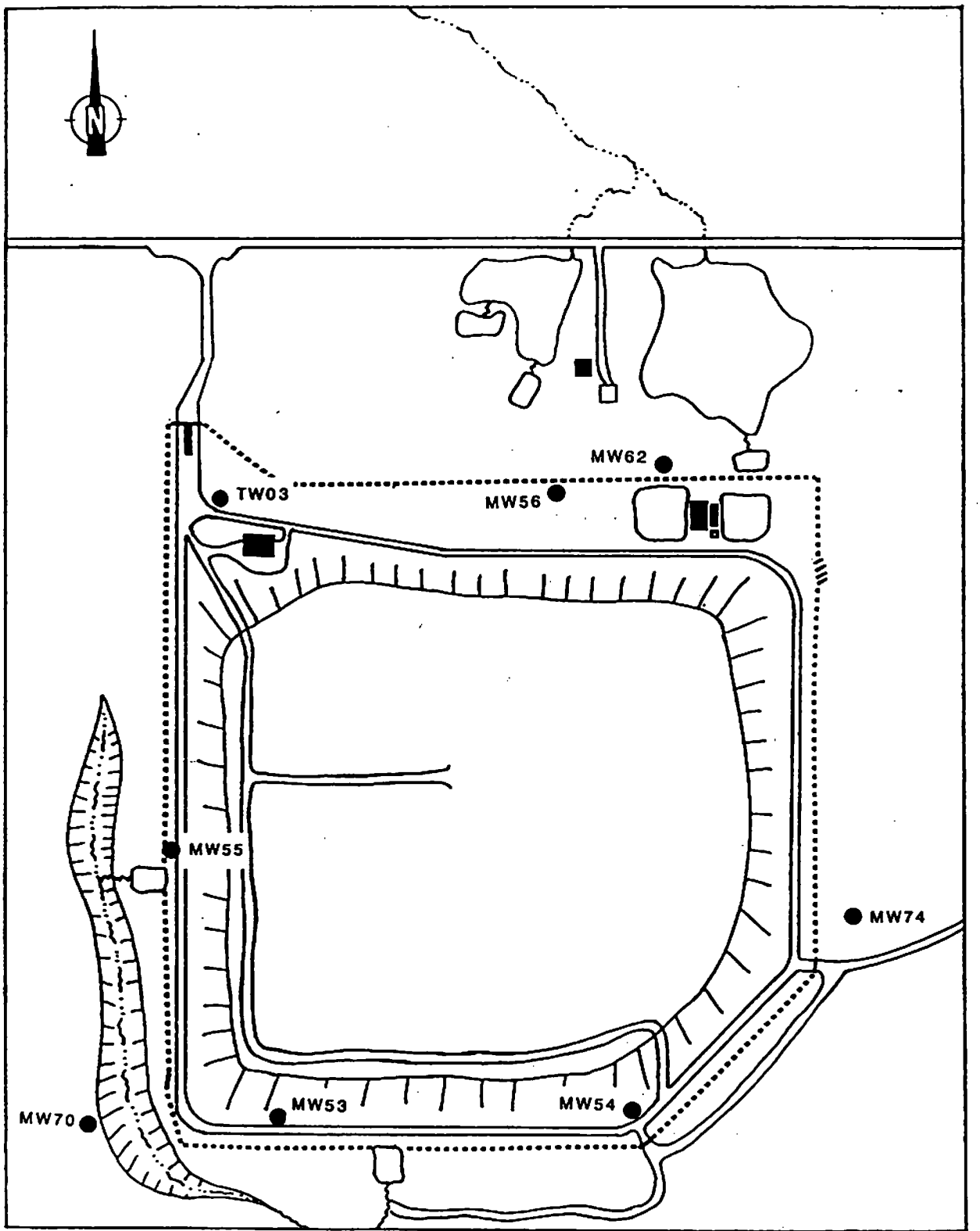
All soil samples were collected using garden trowels to transfer the sample material directly into the sample bottles (E & E 1987). Standard E & E decontamination procedures were adhered to during the collection of all soil samples. These procedures included the scrubbing of all trowels with a solution of Alconox detergent and distilled water and triple-rinsing the trowels with distilled water before the collection of each sample (E & E 1987). All soil samples were packaged and shipped in accordance with U.S. EPA-required procedures.

As directed by U.S. EPA, all soil samples were analyzed under the U.S. EPA Contract Laboratory Program (CLP) for TCL compounds by IT Corporation of Cerritos, California, and for TAL analytes by Enseco/ Rocky Mountain Analytical of Arvada, Colorado.

Monitoring Well Sampling Procedures. Eight samples were collected from monitoring wells on-site to determine whether TCL compounds and TAL analytes had migrated into groundwater in the vicinity of the site (see Figure 3-5 for monitoring well sampling locations). A duplicate monitoring well sample (designated as MWD) was collected at sample location MW62, and a field blank was prepared in accordance with U.S. EPA QA/QC requirements.

Monitoring well samples MW70 and MW74 were collected as potential upgradient samples because groundwater flow is generally from the southeast toward the north, west, and southwest (KCDPW 1986). Monitoring well samples TW03, MW53, MW54, MW55, MW56, and MW62 were collected as downgradient samples.

All monitoring wells were purged of five volumes of standing water in the well before samples were collected, with the exception of MW62, which is pumped for 10 hours per day into the treated leachate lagoon. This sample was collected by filling the bottles directly from the outlet pipe. Stainless steel and PVC bailers were used to purge all moni-



SOURCE: Ecology and Environment, Inc. 1990.

SCALE

0 500 1000 1,500 FEET

FIGURE 3-5 MONITORING WELL SAMPLING LOCATIONS

toring wells, but only stainless steel bailers were used to sample the groundwater. Static water level measurements were also collected at each monitoring well sampled by FIT, except MW62 (see Table 3-2 for calculations of FIT-determined static water elevations).

Standard E & E decontamination procedures were adhered to during the collection of all monitoring well samples. These procedures included the scrubbing of all equipment (e.g., bailers and metal tape) with a solution of Alconox detergent and distilled water, and triple-rinsing it with distilled water prior to the collection of each sample (E & E 1987). All monitoring well samples were packaged and shipped in accordance with U.S. EPA-required procedures.

As directed by U.S. EPA, samples TW03, MW53, MW54, MW55, MW56, MW62, MW70, and MW74, as well as the duplicate and blank samples, were analyzed under the U.S. EPA CLP for TCL compounds by IT Corporation of Cerritos, California, and for TAL analytes by Enseco/Rocky Mountain Analytical of Arvada, Colorado.

Table 3-2

FIT-DETERMINED STATIC WATER ELEVATIONS

Well	Top of Casing (USGS Metric)	Top of Casing (USGS feet)	Depth to Water (feet)	USGS Static Water Level
TW03	273.60	897.63	36.32	861.31
MW53	272.60	894.35	22.01	872.34
MW54	278.30	913.05	36.30	876.75
MW55	272.30	893.36	28.82	864.54
MW56	264.60	868.10	25.79	842.31
MW62	-	-	-	-
MW70	273.60	897.63	51.71	845.92
MW74	268.40	880.57	11.82	868.75

Notes: USGS Metric Top of Casing measurements done by KCDPW.
Metric measurements converted to feet using factor of 3.2808 feet/meter.

- Could not be measured.

Source: Ecology and Environment, Inc. 1990.

4. ANALYTICAL RESULTS

4.1 INTRODUCTION

This section includes results of chemical analysis of FIT-collected soil, monitoring well, and residential well samples for TCL compounds and TAL analytes.

4.2 RESULTS OF CHEMICAL ANALYSIS OF FIT-COLLECTED SAMPLES

Soil Samples. Chemical analysis of FIT-collected soil samples revealed substances from the following groups of TCL compounds and TAL analytes: aromatics, phenols, a polyaromatic hydrocarbon, metals, heavy metals, common laboratory artifacts, and common soil constituents (see Table 4-1 for complete soil sample chemical analysis results).

[redacted]

Monitoring Well Samples. Chemical analysis of FIT-collected monitoring well samples revealed substances from the following groups of TCL compounds and TAL analytes: halogenated hydrocarbons, aromatics, heavy metals, common laboratory artifacts, and groundwater constituents common to the area (see Table 4-3 for complete monitoring well sample chemical analysis results).

U.S. EPA quantitation/detection limits used in the analysis of soil, residential well, and monitoring well samples are provided in Appendix D.

Table 4-1
RESULTS OF CHEMICAL ANALYSIS OF
PIT-COLLECTED SOIL SAMPLES

Sample Collection Information and Parameters	Sample Number S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Date	10/25/88	10/25/88	10/25/88	10/25/88	10/25/88	10/25/88	10/25/88	10/25/88	10/25/88	10/25/88
Time	1255	1310	1320	1335	1350	1400	1410	1435	1431	1435
CLP Organic Traffic Report Number	EAB54	EAB55	EAB56	EAB57	EAB58	EAB59	EAB60	EAB61	EAB62	EAB63
CLP Inorganic Traffic Report Number	MEBB77	MEBB78	MEBB79	MEBB80	MEBB81	MEBB82	MEBB83	MEBB84	MEBB85	MEBB86
Compound Detected (values in µg/kg)										
Volatile Organics										
acetone	97BJ	--	--	--	--	--	--	--	42BJ	--
toluene	1J	--	--	--	--	3J	--	--	8	--
ethylbenzene	--	--	--	--	--	2J	--	--	3J	--
xylenes (total)	--	--	--	--	--	5J	--	--	--	--
Semivolatile Organics										
phenol	42J	--	--	--	44J	--	46J	--	--	--
4-methylphenol	75J	--	--	--	--	--	--	--	170J	--
fluoranthene	--	--	--	--	38J	--	--	--	--	--
bis(2-ethylhexyl)phthalate	82J	--	130J	--	--	--	--	--	--	--
Analyte Detected (values in mg/kg)										
aluminum	3,600	4,270	2,070	3,430	3,480	2,280	5,730	5,840	3,590	7,080
arsenic	1.5B	1.7B	.91BWJ	1.4B	.76BWJ	.51B	1.1BWJ	1.3B	1B	2.4
barium	27.9B	20.9B	9.3B	20.3B	22.3B	16B	37.4B	51.5	24.8B	40.3B
beryllium	--	--	--	--	--	--	.38B	--	--	.45B
calcium	21,300*J	31,900*J	26,100*J	18,900*J	8579*J	5,690*J	28,400*J	1,430*J	16,100*J	39,900*J
chromium	7.6	8.8J	5.4J	5.9J	4J	4.8J	16.2	7.8J	7.6J	17.1
cobalt	5.3B	3.1B	2B	2.3B	1.2B	1.5B	4.1B	3B	2.3B	4.5B
copper	16.7	9J	9.2J	6.4J	6.3J	5.3BJ	8.5J	6.2J	10.2	13.7
iron	8,070	8,080	5,290	6,260	4,280	3,500	8,380	7,200	6,460	11,200
lead	60.3*JN	5.9	6.2	5.9	7.4	3.3	5.75	14.5	5.5	9.8
magnesium	11,600*	11,900*	15,400*	11,500*	6570*	2,980*	14,700*	1,040B*	7,120*	20,400*
manganese	98.7*	87.1	190*	115*	256*	122*	446*	486*	185*	313*
nickel	9B	6.7B	5.6B	5.8B	3.3B	3.5B	9.1B	7.1B	5.1B	12.1
potassium	462B	581B	296B	458	177B	221B	869B	405B	476B	1,020B
silver	1.3BJ	.97BJ	1.5BJ	--	--	1BJ	1.3BJ	--	--	1.3BJ
vanadium	9.4B	11.5B	6B	9.3B	5.6B	5.3B	13	10.6B	9.3B	16.7
zinc	24.8EJ	18.6EJ	22.7EJ	16.2EJ	18.6EJ	11.6EJ	24.2EJ	28.9EJ	33.8EJ	39.8EJ

-- Not detected.

Table 4-1 (Cont.)

COMPOUND QUALIFIERS	DEFINITION	INTERPRETATION
J	Indicates an estimated value.	Compound value may be semiquantitative.
B	This flag is used when the compound is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.	Compound value may be semiquantitative if it is <5x the blank concentration (<10x the blank concentrations for common laboratory artifacts: phthalates, methylene chloride, acetone, toluene, 2-butanone).

ANALYTE QUALIFIERS	DEFINITION	INTERPRETATION
E	Estimated or not reported due to interference. See laboratory narrative.	Analyte or element was not detected, or value may be semiquantitative.
N	Spike recoveries outside QC protocols, which indicates a possible matrix problem. Data may be biased high or low. See spike results and laboratory narrative.	Value may be quantitative or semi-quantitative.
*	Duplicate value outside QC protocols which indicates a possible matrix problem.	Value may be quantitative or semiquantitative.
B	Value is real, but is above instrument DL and below CRDL.	Value may be quantitative or semiquantitative.
J	Value is above CRDL and is an estimated value because of a QC protocol.	Value may be semiquantitative.
W	Post-digestion spike for furnace AA analysis is out of control limits (85-115%), while sample absorbance is <50% of spike absorbance.	Value may be semiquantitative.

Source: Ecology and Environment, Inc. 1990.

Table 4-2
RESULTS OF CHEMICAL ANALYSIS OF
FIT-COLLECTED RESIDENTIAL WELL SAMPLES

Sample Collection Information and Parameters	Sample Number RW1	RW2	RW3	RW4	RW5	RWD	Blank
Date	10/25/88	10/25/88	10/25/88	10/25/88	10/25/88	10/25/88	10/25/88
Time	1610	1620	1630	1730	1810	1610	1500
CLP Organic Traffic Report Number	EAB64	EAB65	EAB66	EAB67	EAB68	EAB69	EAB70
CLP Inorganic Traffic Report Number	MEBB87	MEBB88	MEBB89	MEBB90	MEBB91	MEBB92	MEBB93
Temperature (°C)	10	10	12	8	10	10	7
Specific Conductivity (μmhos/cm)	360	600	400	550	560	360	0
pH	7.39	7.57	7.80	7.90	7.78	7.39	8.9
Compound Detected (values in μg/L)							
Volatile Organics							
chloroform	—	—	—	—	—	—	4
1,1,1-trichloroethane	—	2	—	—	—	—	—
bromodichloromethane	—	—	—	—	—	—	1J
Semivolatile Organics							
phenol	—	2	—	—	—	—	2
Analyte Detected (values in μg/L)							
barium	[19]	[78]	[17]	[32]	[69]	[19]	—
calcium	64,700	115,000	63,400	75,900	96,600	62,900	[429]
copper	—	—	—	—	—	—	33JN
iron	[74]	641	[84]	[81]	256	118	[63]
lead	—	[4.2]s	[1.5]s	56.9s	[1.4]s	[1.2]s	—
magnesium	26,400	51,900	24,900	32,300	43,200	25,800	—
manganese	—	[4]	[2]	—	40	[2]	—
potassium	—	[1,820]	—	—	—	—	—
sodium	[1,310]	25,500	15,900	29,300	[4,300]	[1,380]	[471]
zinc	136JN	561JN	183JN	152JN	220JN	180JN	119JN

— Not detected.

Table 4-2 (Cont.)

COMPOUND QUALIFIER	DEFINITION	INTERPRETATION
J	Indicates an estimated value.	Compound value may be semiquantitative.

ANALYTE QUALIFIERS	DEFINITION	INTERPRETATION
S	Analysis by Method of Standard Additions.	Value is quantitative.
N	Spike recoveries outside QC protocols, which indicates a possible matrix problem. Data may be biased high or low. See spike results and laboratory narrative.	Value may be quantitative or semi-quantitative.
[ ]	Value is real, but is above instrument DL and below CRDL.	Value may be quantitative or semi-quantitative.
J	Value is above CRDL and is an estimated value because of a QC protocol.	Value may be semiquantitative.

Source: Ecology and Environment, Inc. 1990.

Table 4-3
RESULTS OF CHEMICAL ANALYSIS OF
FIT-COLLEDIER MONITORING WELL SAMPLES

Sample Collection Information and Parameters	Sample Number: MW63	TW03	MW53	MW54	MW55	MW56	MW70	MW74	MW0	Blank
Date	10/26/88	10/26/88	10/26/88	10/26/88	10/26/88	10/26/88	10/26/88	10/26/88	10/26/88	10/26/88
Time	1330	1410	1550	1620	1855	1645	1945	1630	1330	1510
CLP Organic Traffic Report Number	EAB71	EAB72	EAB73	EAB74	EAB75	EAB76	EAB77	EAB78	EAB79	EAB80
CLP Inorganic Traffic Report Number	MEBU99	MEBU00	MEBU01	MEBU02	MEBU03	MEBU04	MEBU05	MEBU06	MEBU07	MEBU08
Temperature (°C)	6	7	8	8	9.9	7	9.9	8	6	7
Specific Conductivity (pmhos/cm)	1,000	750	1,000	1,250	1,500	800	400	400	1,000	10
pH	6.8	7.8	7.25	6.98	6.8	7.15	7.34	7.4	6.9	8.39
Compound Detected (values in ug/L)										
Volatile Organics										
vinyl chloride	11	--	17	13	34	92	--	--	93	--
chloroethane	31	83	27	18	37	11	--	--	28	--
1,1-dichloroethene	--	--	--	--	--	33	--	--	13	--
1,1-dichloroethane	130	54	53	52	3000	53	--	--	120	--
1,2-dichloroethene (total)	33	--	--	41	280	12	--	--	37	--
2-butanone (MEK)	--	--	--	--	--	--	--	--	--	6J
1,1,1-trichloroethane	35	62	3J	--	10	86	--	--	37J	--
trichloroethene	16	--	5	7	84	6	--	--	16	--
benzene	7J	--	5J	3J	30J	--	--	--	5J	--
tetrachloroethene	--	--	--	5	37	--	--	--	2J	--
xylenes (total)	--	--	--	--	25J	--	--	--	5J	--
Semivolatile Organics										
benzyl alcohol	--	20J	--	--	--	--	--	--	--	--
bis(2-ethylhexyl)phthalate	--	6B	--	22	--	7J	3J	4J	--	--
Analyte Detected (values in ug/L)										
aluminum	--	44.6BJ	49BJ	--	34.5BJ	--	55BJ	39.8BJ	28.6BJ	36.3BJ
arsenic	33.7s	--	--	3.4B	4B	1.5BWJ	--	--	33s	--
barium	109B	59.7B	115B	33B	6.19B	111B	21.1B	17.9B	109B	3.5BJ
calcium	191,000	125,000	257,000	199,000	225,000	227,000	59,700	51,000	168,000	522BJ
chromium	--	--	--	--	--	--	4.2B	--	--	--
cobalt	8.9B	--	--	--	--	--	--	--	10.3B	--
copper	6.1BJ	6.7BJ	10.6BJ	5.1BJ	22.1BJ	4.8BJ	9.6BJ	7.2BJ	6.3BJ	60.5J
iron	13,600	63.3B	3,130	3,990	8,670	1,560	328	35.5B	15,100	51.3B
lead	--	6.5s	--	--	5.5	--	--	--	--	--
magnesium	57,600	46,600	52,400	51,700	89,900	55,800	28,900	29,200	64,100	119BJ
manganese	412	109	350	1,120	489	102	8.6B	19.4	459	--
nickel	16.9B	--	--	8.6B	--	--	--	--	17.3B	--
potassium	2,620B	2,920B	2,790B	1,920B	1,730B	1,900B	758B	1,210B	2,610B	--
sodium	72,600	42,500	12,600	14,800	9,530	56,600	5,960	3,670B	79,500	1,100BJ
zinc	77.4	9,550	211	356	109	248	2,390	833	57.1	34.2J

-- Not detected.

Table 4-3 (Cont.)

COMPOUND QUALIFIERS	DEFINITION	INTERPRETATION
C	Indicates an estimated value.	Compound value may be semiquantitative.
D	This flag identifies all compounds identified in an analysis at a secondary dilution factor.	Alerts data user to a possible change in the CRQL. Data is quantitative.

ANALYTE QUALIFIERS	DEFINITION	INTERPRETATION
S	Analysis by Method of Standard Additions.	Value is quantitative.
B	Value is real, but is above instrument DL and below CRDL.	Value may be quantitative or semi-quantitative.
J	Value is above CRDL and is an estimated value because of a QC protocol.	Value may be semiquantitative.
W	Post-digestion spike for furnace AA analysis is out of control limits (85-115%), while sample absorbance is <50% of spike absorbance.	Value may be semiquantitative.

Source: Ecology and Environment, Inc. 1990.

5. DISCUSSION OF MIGRATION PATHWAYS

5.1 INTRODUCTION

This section contains a discussion of data and information that apply to potential migration pathways and targets of TCL compounds and TAL analytes that may be attributable to the KCPL site.

The five migration pathways of concern discussed are groundwater, surface water, air, fire and explosion, and direct contact.

5.2 GROUNDWATER

The following TCL compounds were detected in on-site soil samples at levels above those detected in the background soil sample (designated as S8). The sample designation and the maximum concentration detected follow the name of each TCL compound. TCL compounds detected in soil samples include (in µg/kg): toluene (S9; 8), ethylbenzene (S9; 3), total xylenes (S6; 5), phenol (S7; 46), 4-methylphenol (S9; 170), and fluoranthene (S5; 38). No TCL compounds were detected in the background sample. Some of the TAL analytes detected in soil samples are listed here, with sample designations, followed by the maximum concentration detected, and the background concentration of that analyte (in mg/kg): calcium (S10; 39,900; 1,430), lead (S1; 62.3; 14.5), and magnesium (S10; 20,400; 1,040). Although calcium and magnesium have low relative toxicities, they are listed here as potential indicators of foundry wastes, with which they are commonly associated.

The following TCL compounds were detected in FIT-collected on-site monitoring well samples. Following the name of each compound is the sample designation and maximum concentration detected (in µg/L): vinyl

chloride (MW55; 34), chloroethane (MW55; 37), 1,1-dichloroethane (MW55; 300), 1,2-dichloroethene (MW55; 280), 1,1,1-trichloroethane (MW56; 86), trichloroethene (MW55; 84), benzene (MW55; 30), tetrachloroethene (MW55; 37), total xylenes (MW55; 25), and benzyl alcohol (TW03; 20). No TCL compounds were detected in the upgradient monitoring well (designated as MW74). Some of the TAL analytes detected in on-site monitoring well samples are listed with the sample designations, maximum concentrations detected, and the background concentration of the analyte (ND = not detected). TAL analytes detected include (in µg/L): arsenic (MW62; 33.7; ND), chromium (MW70; 4.2; ND), iron (MW62; 15,100; 35.5), lead (TW03; 6.5; ND), nickel (MW62; 17.3; ND), sodium (MW62; 79,500; 3,670), and zinc (TW03; 3,550; 832). Although sodium has a low relative toxicity, it is listed here as a potential indicator of electroplating wastes, with which it is commonly associated.

The only TCL compound detected in residential well samples was 1,1,1-trichloroethane, detected at 2 µg/L in RW2. This compound was not detected in the upgradient residential well sample. The only TAL analyte detected well above the concentration in the upgradient residential well sample was lead, detected at 56.9 µg/L in RW4. The concentration in the upgradient sample was 1.4 µg/L. Of the nine TAL analytes detected in residential well samples, RW2, an apparent downgradient well, contained the highest concentrations of six of the nine analytes.

TCL compounds and TAL analytes have been detected in groundwater in the vicinity and appear to be attributable to the KCPL site. This conclusion is based on the following information.

- TCL compounds and TAL analytes have been detected in all types of samples collected at the site.

- The KCPL site has a history of accepting organic and inorganic industrial wastes (Kamps 1980; Bobosky 1981).

- The underdrain outfalls, which are used for devatering the site below the liner and leachate collection system, have

been contaminated, indicating a failure in the liner and/or leachate collection system (Woods 1988).

- The leachate lagoon has overflowed in the past, allowing raw leachate to seep into the ground (Heyt 1980).

- Based on the groundwater flow direction, there do not appear to be any potential sources of contamination upgradient of the site.

- Local residential wells may be experiencing the first signs of a groundwater plume that could be spreading in several directions.

The attribution of TCL compounds and TAL analytes in groundwater in the vicinity to the KCPL site is also based on the following geologic information.

The site is located in between two former glacial moraines (an interlobate tract) where the simultaneous deposition of glacial drift materials from both glacial lobes contributed to the glacial geology. This simultaneous deposition caused intermixing of glacial materials which resulted in very complex substrata (Tanner 1975). This fact is reflected in logs of soil boring conducted on-site by Keck Consultants, which show alternating layers of sandy loams, clay tills, medium to fine sands, gray or brown dense clays, and lenses of cobbles and gravels (see Appendix E for soil boring and monitoring well logs of the site). These surficial layers do not appear to have any areal consistency (Kniecik 1985). Some localized perched water conditions may also exist on-site.

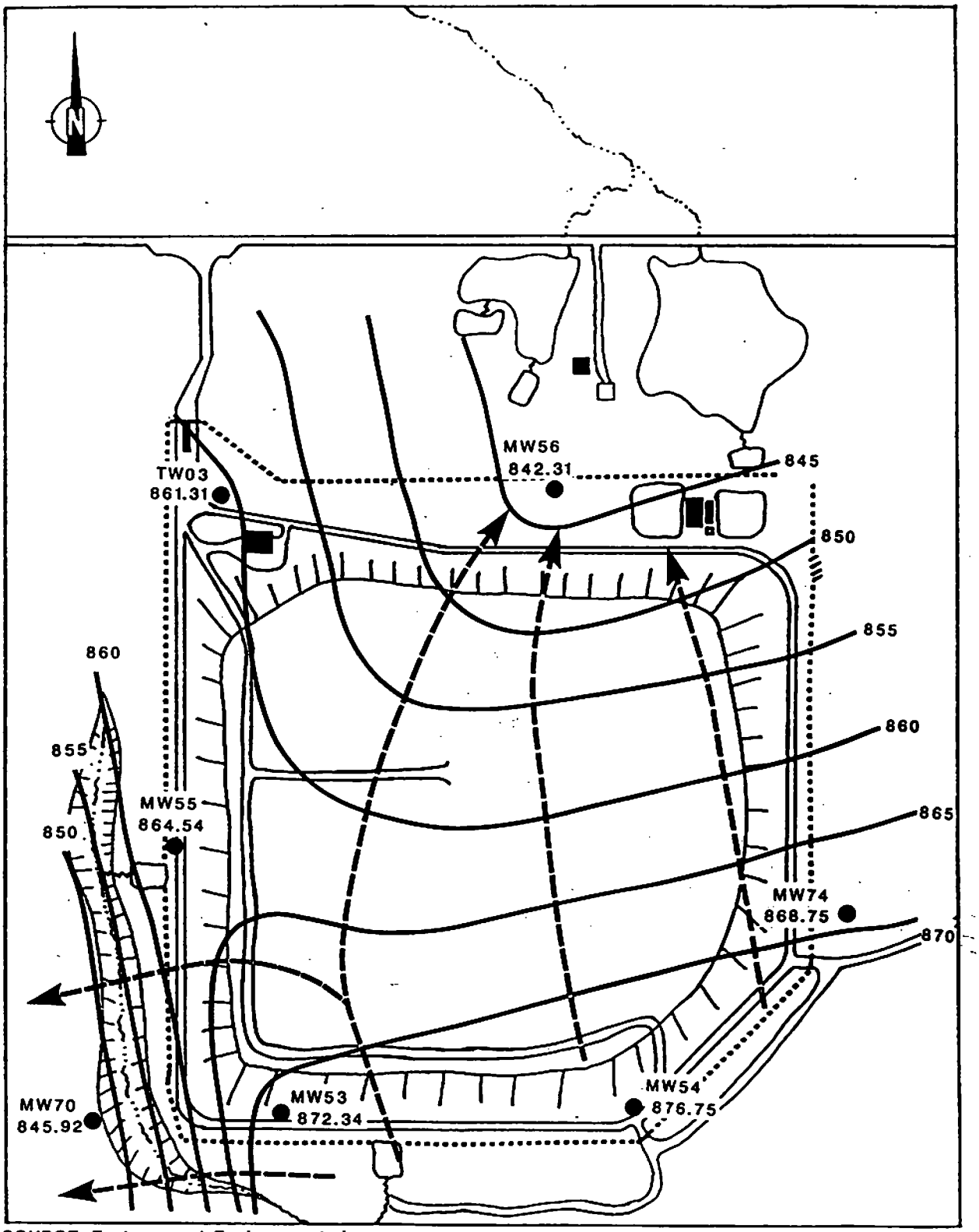
Before the site was constructed, at least seven natural springs were present on-site. The high water table necessitated the dewatering trenches (Dauphin 1974). Two apparently distinct glacial drift aquifers are present in the area of the site. The first is the shallow water table aquifer just described. An examination of area private water well logs indicates that approximately 50% of residential wells in the area are screened in this aquifer at depths between 25 and 70 feet below the ground surface.

Well logs indicate that a second, confined drift aquifer is encountered at depths of 150 to 200 feet below the ground surface and appears to be separated from the water table aquifer by a fairly continuous and thick clay layer in the vicinity of the site. Michigan's state geologist testified at the time of construction of the site that any interconnections between the two drift aquifers in the immediate area of the site was highly unlikely (Fulkerson 1976). The other 50% of private wells in the area are screened in this lower drift aquifer. However, interconnections may exist between the two drift aquifers within a 3-mile radius of the site.

There are a few private wells that draw water from the bedrock, which is composed of Mississippian Marshall sandstone. Bedrock occurs at depths of 220 to 250 feet and layers of limestone and shale are also present in the sandstone formation. This may indicate that the site is located in an area of a bedrock facies change.

On-site water level measurements collected by FIT indicate that groundwater flows from the southeast but divides upon reaching the landfill. The majority of flow continues toward the north and the remainder continues west and southwest (see Figure 5-1 for groundwater elevation contours). This groundwater flow pattern could be slightly misrepresentative due to the possibility of perched water conditions in some areas on-site. Well logs of the area of the site are provided in Appendix F.

The total target population for groundwater contamination includes approximately 1,240 persons within a 3-mile radius of the site. This number was calculated by a house count from United States Geological Survey (USGS) topographic maps from the area of the site (USGS 1972) multiplied by the U.S. Census figure of 2.78 persons per household in Kent County (U.S. Bureau of the Census 1982). This method yielded a total of 2,480 persons. Assuming that no interconnection exists between the upper water table aquifer and the apparently confined drift aquifer, approximately 50% of the calculated 2,480 persons draw from the upper water table aquifer. Two areas within the 3-mile radius were excluded from this calculation. The city of Rockford's municipal water system utilizes the Rogue River as its drinking water source (Van Horne 1988),



SOURCE: Ecology and Environment, Inc. 1990.

0 500 SCALE 1000 1,500 FEET

CONTOUR INTERVAL 5 FEET

FIGURE 5-1 GROUNDWATER ELEVATION COUNTOURS

and the Belmont area utilizes well fields that are located south of the Grand River, which is outside of the 3-mile radius (Rekeny 1988).

5.3 SURFACE WATER

No surface water samples were collected by FIT at the KCPL site. However, surface water samples collected by MDNR have shown contamination at the underdrain outfalls, which form a small stream that feeds into the Rogue River. However, this surface water sampling was not able to document the migration of contaminants from these outfalls downstream (Woods 1988a). A copy of the MDNR surface water sampling data and accompanying memorandum are provided in Appendix G.

A potential exists for TCL compounds and TAL analytes to migrate to surface water bodies in the area of the site. This potential is based on the following information.

- Surface water testing for limited parameters, conducted at the site by MDNR, has shown contamination at the headwaters for a small stream that feeds into the Rogue River.

- TCL compounds and TAL analytes were detected in surface soil samples collected by FIT. Surface runoff flows into the three sedimentation basins around the site and they in turn feed small intermittent streams that drain the site.

- The leachate lagoon has overflowed its banks in the past (Heyt 1980).

- Leachate seeps were observed by FIT in several areas of the landfill.

- Several small lakes and wetlands are present west of the site at a distance of between 1 and 3 miles.

- The portion of the contaminated groundwater that is flowing west from the site may be discharging to these small lakes and wetlands.

The total target population potentially affected by surface water contamination includes the population of Rockford, which has a drinking intake on the Rogue River that supplies 3,324 persons in the city of Rockford. The potential for this population to be affected is minimal because the intake is located approximately 4 to 5 downstream miles from the point of known surface water contamination. The Rogue River and the small lakes in the area are used for recreational purposes, but the population affected in this manner cannot be determined.

5.4 AIR

A release of potential contaminants to the air was not documented during the FIT SSI of the KCPL site. During the reconnaissance inspection, FIT-site entry equipment (OVA 128, oxygen meter, explosimeter, hydrogen cyanide detector, and radiation monitor) did not detect levels above background concentrations at the site (E & E 1987). In accordance with the U.S. EPA-approved work plan, further air monitoring was not conducted by FIT.

The KCPL site has had a history of odor problems and complaints from the public (Pryzbysz 1985). These odor problems stemmed from the leachate lagoons and from odorous gases emanating from the landfill itself. The problem of odors from the leachate lagoons was addressed by spraying a stable foam on the surface of the lagoons to control odors. The problem of landfill gases is being addressed with plans for a landfill gas collection system that has been permitted for construction. This construction had not begun at the time of the FIT SSI. Methane gases were emanating from numerous gas fields that had developed in the landfill cap and from the leachate manholes.

There is a potential for TCL compounds and TAL analytes to migrate to the air from the site. Most of the TCL compounds detected at the site are volatile and could be carried to the air as a component of landfill gas. There is also a potential for contaminants to be carried as airborne particulates, although this potential is slight because

vegetation covers most areas of the site and would inhibit dry and dusty-conditions.

The total target population potentially affected by air contamination includes 7,699 persons within a 4-mile radius of the site. This number includes the population of the city of Rockford. The population outside of Rockford was calculated using the method described in Subsection 5.2.

5.5 FIRE AND EXPLOSION

According to Jack Bridges, Fire Chief of the Plainfield Township Fire Department, there may be a remote potential for fire and explosion at the KCPL site due to the large amounts of methane present. Bridges also stated that no fires or explosions that he is aware of have occurred at the site in the past. FIT observations and explosimeter readings indicated that there is no apparent potential for fire or explosion at the KCPL site.

5.6 DIRECT CONTACT

According to federal, state, and local file information reviewed by FIT, and interviews with local officials, there is no documentation of an incident of direct contact with TCL compounds and TAL analytes detected at the KCPL site.

There is a potential that the public could come into direct contact with TCL compounds and TAL analytes detected at the site. This potential is based on the following information:

- TCL compounds and TAL analytes have been detected in on-site surface soil samples;

- The site is completely fenced, but there are breaks in the fencing for two of the three sedimentation basins, and the fencing is knocked down in one area along the perimeter of the site;

- The contaminated underdrain basins as well as three sedimentation basins are located outside of the fencing; and

- There is no security guard or other means of security utilized at the site.

The total target population potentially affected by direct contact includes approximately 194 persons within a 1-mile radius of the site. This number was calculated using the method described in Subsection 5.2.

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2406:8

A

APPENDIX A

SITE 4-MILE RADIUS MAP

B

APPENDIX B

U.S. EPA FORM 2070-13

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

EPA

I. IDENTIFICATION
01 STATE: MI | 02 SITE NUMBER: D000265066

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER				
Kent County Plainfield Landfill	2908 10 Mile Road				
03 CITY	**04 STATE**	**05 ZIP CODE**	**06 COUNTY**	**07 COUNTY CODE**	**08 CONG DIST**
Grand Rapids	MI	49341	Kent	081	5

09 COORDINATES: LATITUDE 42°59'00.0" | LONGITUDE 85°37'46.4"

10 TYPE OF OWNERSHIP (Check one): ☐ A. PRIVATE ☐ B. FEDERAL ☐ C. STATE ■ D. COUNTY ☐ E. MUNICIPAL ☐ F. OTHER ☐ G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION	02 SITE STATUS	03 YEARS OF OPERATION
10 25 88 (MONTH DAY YEAR)	☐ ACTIVE ■ INACTIVE	1977 (BEGINNING YEAR) 1986 (ENDING YEAR) ☐ UNKNOWN

04 AGENCY PERFORMING INSPECTION (Check all that apply)
☐ A. EPA ■ B. EPA CONTRACTOR Ecology & Environment, Inc. (Name of firm) ☐ C. MUNICIPAL ☐ D. MUNICIPAL CONTRACTOR _____ (Name of firm)
☐ E. STATE ☐ F. STATE CONTRACTOR _____ (Name of firm) ☐ G. OTHER _____ (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO.
Steve Bunsen	Biologist	E&E, Inc.	(312)663-9415
09 OTHER INSPECTORS	**10 TITLE**	**11 ORGANIZATION**	**12 TELEPHONE NO.**
Terry Sullivan	Chemical Engineer	E&E, Inc.	(312)663-9415
Frank Santella	Geologist	E&E, Inc.	(312)663-9415
Loretta Guzdziol	Chemical Engineer	E&E, Inc.	(312)663-9415
Randy Livingston	Geographer	E&E, Inc.	(312)663-9415
Cindy Schultz	Env. Health Specialist	E&E, Inc.	(312)663-9415
13 SITE REPRESENTATIVES INTERVIEWED	**14 TITLE**		**16 TELEPHONE NO**
Jerry Powell	Civil Engineer	[redacted]	(616)774-3694
			( )
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
■ PERMISSION ☐ WARRANT	0915	Low 40's, windy, drizzle mixed with snow

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO.
Roger Przybysz	Michigan Dept. of Natural Resources	(616)456-5071

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE
Steve Bunsen	U.S. EPA	E&E, Inc.	312-663-9415	2 16 89 (MONTH DAY YEAR)

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
MI	D000265066

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- ■ A. SOLID
- ☐ B. POWDER, FINES
- ■ C. SLUDGE
- ☐ D. OTHER _____ (Specify)
- ☐ E. SLURRY
- ☐ F. LIQUID
- ☐ G. GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

TONS 1,750,000 *

CUBIC YARDS _____

NO OF DRUMS _____

03 WASTE CHARACTERISTICS (Check all that apply)

- ■ A. TOXIC
- ■ B. CORROSIVE
- ☐ C. RADIOACTIVE
- ■ D. PERSISTENT
- ■ E. SOLUBLE
- ☐ F. INFECTIOUS
- ■ G. FLAMMABLE
- ■ H. IGNITABLE
- ☐ I. HIGHLY VOLATILE
- ☐ J. EXPLOSIVE
- ☐ K. REACTIVE
- ☐ L. INCOMPATIBLE
- ☐ M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE	UNK		*1,750,000 tons refers to the total amount of trash and waste received over the operating history of the site
OLW	OILY WASTE	UNK		
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			
ACD	ACIDS			
BAS	BASES			
MES	HEAVY METALS			

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
The following substances were detected in FIT collected soil samples:					
SOL	toluene	108-88-3	SG	8	ug/kg
SOL	ethyl benzene	100-41-4	SG	3J	ug/kg
SOL	xylenes	1330-20-7	SG	5J	ug/kg
OCC	phenol	108-95-2	SG	46J	ug/kg
OCC	4-methylphenol	106-44-5	SG	170J	ug/kg
OCC	Fluoranthene	206-44-0	SG	38J	ug/kg
MES	lead	7439-92-1	SG	62.3 * NJ	mg/kg
MES	magnesium	7439-95-4	SG	20,400 *	mg/kg
The following substances were detected in FIT collected monitoring well samples:					
OCC	vinyl chloride	75-01-4	MW55	34	ug/l
OCC	chloroethane	75-00-3	MW55	37	ug/l
SOL	1,1 dichloroethane	75-34-3	MW55	300 D	ug/l
SOL	1,2 dichloroethene	540-59-0	MW55	280	ug/l

+ cont'd on following page

V. FEEDSTOCKS (See Appendix for CAS Numbers) N/A

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

E&E, Inc. (FIT) site inspection.

* Continued from Part II, Section IV.

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
SOL	1,1,1 trichloroethane	71-55-6	MW56	86	ug/l
SOL	trichloroethene	79-01-6	MW55	84	ug/l
SOL	benzene	71-43-2	MW55	30 J	ug/l
SOL	tetrachloroethene	127-18-4	MW55	37	ug/l
SOL	xylenes	1330-20-7	MW55	25 J	ug/l
SOL	benzyl alcohol	100-51-6	TW03	20 J	ug/l
MES	arsenic	7440-38-2	MW62	33.7 S	ug/l
MES	iron	7439-89-6	MW62	15,100	ug/l
MES	lead	7439-92-1	TW03	6.5 S	ug/l
MES	manganese	7439-96-5	MW54	1,120	ug/l
MES	nickel	7440-02-0	MW62	17.3 B	ug/l

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION
01 STATE: MI | 02 SITE NUMBER: D000265066

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ■ A. GROUNDWATER CONTAMINATION | 02 ■ OBSERVED (DATE: 10/25/88) | □ POTENTIAL | □ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ~1,240 | 04 NARRATIVE DESCRIPTION
Monitoring well samples detected halogenated hydrocarbons, aromatics, and heavy metals. There are at least two aquifers used in the area of the site and only the upper one appears to be contaminated. About half of the local residents have their wells screened in the upper sand and gravel aquifer.

01 ■ B. SURFACE WATER CONTAMINATION | 02 □ OBSERVED (DATE:) | ■ POTENTIAL | □ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 3,324 | 04 NARRATIVE DESCRIPTION
The city of Rockford uses the Rogue River for its drinking water supply. Underdrain outfalls from the site are the source of an intermittent stream which may feed into the Rogue River but the city's intakes are about 4-5 downstream miles from the point of known surface water contamination.

01 ■ C. CONTAMINATION OF AIR | 02 □ OBSERVED (DATE:) | ■ POTENTIAL | □ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 7,699 | 04 NARRATIVE DESCRIPTION
Historically, there have been complaints about odors emanating from a leachate pond but a foam is used during warm weather to control this problem. There are large amounts of methane escaping from the landfill but there are plans to build a landfill gas extraction system. FIT instruments detected nothing other than methane.

01 ■ D. FIRE/EXPLOSIVE CONDITIONS | 02 □ OBSERVED (DATE:) | ■ POTENTIAL | □ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 3,286 | 04 NARRATIVE DESCRIPTION
There is a slight potential for a fire/explosion to occur at the site due to the large quantities of methane emanating from it. The leachate manholes act as methane vents on the top of the fill which is the highest ground in the area, possibly susceptible to lightning strikes. Installation of the gas collection system should eliminate the potential.

01 ■ E. DIRECT CONTACT | 02 □ OBSERVED (DATE:) | ■ POTENTIAL | □ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 194 | 04 NARRATIVE DESCRIPTION
This site is completely fenced except at a few points where there are short breaks for sedimentation ponds or pipe lines. The landfill is completely capped but there are open leachate lagoons and underdrain ponds on site and the underdrain ponds are located outside the fence and are known to have been contaminated.

01 ■ F. CONTAMINATION OF SOIL | 02 ■ OBSERVED (DATE: 10/25/88) | □ POTENTIAL | □ ALLEGED
03 AREA POTENTIALLY AFFECTED: 54 (acres) | 04 NARRATIVE DESCRIPTION
FIT-collected soil samples detected aromatics, phenols, polyaromatic hydrocarbons, and heavy metals. There are numerous leachate outbreaks all over the landfill and the clay cap is intact although some areas are devoid of vegetation, and susceptible to future erosion.

01 ■ G. DRINKING WATER CONTAMINATION | 02 ■ OBSERVED (DATE: 10/25/88) | □ POTENTIAL | □ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: ~1,240 | 04 NARRATIVE DESCRIPTION
A nearby residential well was contaminated with 56.9 ppb of lead but it is not clear that the landfill is the source of contamination. Another nearby well was contaminated with 2ppb of TCE but it is also not clear if the landfill is the source. However, both contaminants were detected in on-site monitoring wells. See also A.

01 ■ H. WORKER EXPOSURE/INJURY | 02 □ OBSERVED (DATE:) | ■ POTENTIAL | □ ALLEGED
03 WORKERS POTENTIALLY AFFECTED: 3 | 04 NARRATIVE DESCRIPTION
There are 3 employees on-site who oversee a small on-site waste treatment plant which pretreats raw leachate before it is hauled to the Grand Rapids Waste Water Treatment Plant. The on-site drinking water well is screened in the second uncontaminated aquifer but these workers could be exposed as described in C, D, E, F.

01 ■ I. POPULATION EXPOSURE/INJURY | 02 □ OBSERVED (DATE:) | ■ POTENTIAL | □ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 7,699 | 04 NARRATIVE DESCRIPTION
There is a potential for the local population to be exposed or injured by hazardous substances at the site as described in A-G.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
MI	D000265066

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ■ J. DAMAGE TO FLORA — 02 ■ OBSERVED (DATE: 10/25/88) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
There are signs of stressed vegetation in areas where leachate outbreaks are occurring and some areas are completely devoid of vegetation.

01 ■ K. DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE: _____) ■ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION (Include number(s) of species)
Deer and ground-nesting birds were observed on-site by FIT. The birds nests are actually located on the top of the fill. There is a potential for damage to these species through direct contact or drinking contaminated water, or eating contaminated plants.

01 ■ L. CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE: _____) ■ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
There is a potential for contamination of the food chain if hunters consume deer in the area that may be contaminated as described in J and K above.

01 ■ M. UNSTABLE CONTAINMENT OF WASTES (Spills/Runoff/Standing liquids, Leaking drums) — 02 ■ OBSERVED (DATE: 10/25/88) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: 7,699 — 04 NARRATIVE DESCRIPTION
There are numerous leachate out-breaks on-site, a raw and a treated leachate lagoon (which did overflow once in the past), and 2 underdrain outfall ponds.

01 ■ N. DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE: _____) ● POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
The contaminated water from the underdrain outfalls flows under 10-Mile Road and bisects two livestock-grazing properties, one for cattle and one for sheep. Site owners have warned these property owners not to allow their animals to drink from this stream.

01 ☐ O. CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
There are no known sewers or storm drains in the area. Treated leachate taken to the Grand Rapids WWTP is tested before being accepted and plans are under way to build a sewer line (Force main) to the site for direct disposal of treated leachate.

01 ☐ P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION
According to the site representative, all industrial wastes accepted at the site had to pass an EP Tox. test first before being disposed of on-site. There are no know incidents of illegal/unauthorized dumping.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS
None.

III. TOTAL POPULATION POTENTIALLY AFFECTED: 7,699

IV. COMMENTS
It should be noted that, according to the site representative, the MDNR insisted that clay rather than sand be used as intermediate cover. This causes compartmentalization of the landfill and causes infiltrating precipitation to break out as leachate flows instead of it reaching the leachate collection system, under the landfill.

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)
E&E, Inc (FIT) site inspection.
E&E, Inc (FIT) files.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION
01 STATE: MI | 02 SITE NUMBER: D000265066

II. PERMIT INFORMATION

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
■ A. NPDES	MI0037486	6/22/82	2/28/87	awaiting reissuance
☐ B. UIC				
■ C. AIR	MI62-88	3/11/88	3/11/91	construction permit For landfill gas flare - not an operating permit
☐ D. RCRA				
☐ E. RCRA INTERIM STATUS				
☐ F. SPCC PLAN				
☐ G. STATE (Specify)				
☐ H. LOCAL (Specify)				
■ I. OTHER (Specify) MIU	GR00066	11/1/87	11/1/89	Michigan Industrial User permit For wastewater treatment
☐ J. NONE				

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
■ A. SURFACE IMPOUNDMENT	1,000,000	gallons
☐ B. PILES		
☐ C. DRUMS, ABOVE GROUND		
☐ D. TANK, ABOVE GROUND		
☐ E. TANK, BELOW GROUND		
■ F. LANDFILL		tons
☐ G. LANDFARM		
☐ H. OPEN DUMP		
☐ I. OTHER (Specify)		

04 TREATMENT (Check all that apply)
- ☐ A. INCINERATION
- ☐ B. UNDERGROUND INJECTION
- ■ C. CHEMICAL/PHYSICAL
- ☐ D. BIOLOGICAL
- ☐ E. WASTE OIL PROCESSING
- ☐ F. SOLVENT RECOVERY
- ☐ G. OTHER RECYCLING/RECOVERY
- ☐ H. OTHER (Specify)

05 OTHER
- ■ A. BUILDINGS ON SITE: 3

06 AREA OF SITE: 54 (Acres)

07 COMMENTS: Each of the 2 leachate lagoons have a 500,000 gallon capacity. The raw leachate lagoon has a hyphalon liner and the treated leachate lagoon has a clay liner only. There are also 3 sedimentation basins to catch eroding sediments from the landfill cap and 2 underdrain ponds that capture groundwater from under the landfill's liner system. Leachate is treated with caustic to precipitate metal hydroxides. This sludge is taken to South Kent County Landfill. The total site property is 345 acres but only 54 acres of actual fill.

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one)
☐ A. ADEQUATE, SECURE ☐ B. MODERATE ■ C. INADEQUATE, POOR ☐ D. INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC.
The fact that the underdrains are contaminated is evidence that the liner system has failed. The MDNR has never been able to prove that contamination is migrating away from the underdrain outfalls to the intermittent stream. The diking around the leachate lagoons was breached once before while the treatment plant was being installed. Until it was, the WWTP in Grand Rapids would not accept the wastewater.

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: ☐ YES ■ NO
02 COMMENTS: The cap is intact and fencing surrounds most of the site. There is a locked gate at the entrance

VI. SOURCES OF INFORMATION (Cite specific references, e.g. state files, sample analysis, reports)

E&E, Inc. (FIT) site inspection.
E&E, Inc. (FIT) files.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION
01 STATE: MI | 02 SITE NUMBER: D000265D616

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (Check as applicable)

	SURFACE	WELL
COMMUNITY	A. ■	B. □
NON-COMMUNITY	C. □	D. ■

02 STATUS

	ENDANGERED	AFFECTED	MONITORED
	A. □	B. □	C. ■
	D. ■	E. □	F. □

03 DISTANCE TO SITE
A. 4-5 (mi)
B. .15 (mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY (Check one)
■ A. ONLY SOURCE FOR DRINKING □ B. DRINKING (Other sources available) COMMERCIAL, INDUSTRIAL, IRRIGATION (No other water sources available) □ C. COMMERCIAL, INDUSTRIAL, IRRIGATION (Limited other sources available) □ D. NOT USED, UNUSEABLE

02 POPULATION SERVED BY GROUND WATER: 1,240
03 DISTANCE TO NEAREST DRINKING WATER WELL: .15 (mi)

04 DEPTH TO GROUNDWATER	05 DIRECTION OF GROUNDWATER FLOW	06 DEPTH TO AQUIFER OF CONCERN	07 POTENTIAL YIELD OF AQUIFER	08 SOLE SOURCE AQUIFER
0 (ft)	N, W, and SW	0 (ft)	UNK (gpd)	□ YES ■ NO

09 DESCRIPTION OF WELLS (Including useage, depth, and location relative to population and buildings) Most area residential well logs have their screens set in glacial sand and gravel layers. A very small percentage have their screens set in bedrock (Marshall sandstone) at depths of 220-250 feet. Within the glacial drift, there are 2 distinct aquifers that don't appear to be locally interconnected. About 1/2 of the wells are in the water table aquifer at depths of 20-80 feet. The second drift aquifer is about 150-200 deep.

10 RECHARGE AREA: ■ YES □ NO
COMMENTS: The site is located on topographically high ground with permeable soils and acts as a recharge area to the upper water table aquifer.

11 DISCHARGE AREA: ■ YES □ NO
COMMENTS: At least seven natural springs used to flow on-site but due to dewatering operations, groundwater discharges through 2 underdrain outfalls.

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)
■ A. RESERVOIR, RECREATION DRINKING WATER SOURCE □ B. IRRIGATION, ECONOMICALLY IMPORTANT RESOURCES □ C. COMMERCIAL, INDUSTRIAL □ D. NOT CURRENTLY USED

02 AFFECTED/POTENTIALLY AFFECTED BODIES OF WATER

NAME:	AFFECTED	DISTANCE TO SITE
Rogue River	□	1.9 (mi)
Clear Bottom Lake	□	1.4 (mi)
	□	(mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE	TWO (2) MILES OF SITE	THREE (3) MILES OF SITE
A. 194	B. 3283	C. 5803
NO. OF PERSONS	NO. OF PERSONS	NO. OF PERSONS

02 DISTANCE TO NEAREST POPULATION: 0.15 (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE: 1,182
04 DISTANCE TO NEAREST OFF-SITE BUILDING: 0.15 (mi)

05 POPULATION WITHIN VICINITY OF SITE (Provide narrative description of nature of population within vicinity of site, e.g., rural, village, densely populated urban area)
The population in the immediate vicinity of the site is sparsely populated and rural. About 1.5 miles east of the site is the town of Rockford (pop. 3324) and about 2.5 miles south of the site is the small town of Belmont, just north of the Grand River. Just south of the Grand River, the suburbs of Grand Rapids begin. The areas in the immediate vicinity of the site are undergoing alot of new residential development.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION
01 STATE: MI | 02 SITE NUMBER: D000265066

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one)

☐ A. $10^{-6} - 10^{-8}$ cm/sec ☐ B. $10^{-4} - 10^{-6}$ cm/sec ☐ C. $10^{-4} - 10^{-3}$ cm/sec ■ D. GREATER THAN 10^{-3} cm/sec

02 PERMEABILITY OF BEDROCK (Check one)

☐ A. IMPERMEABLE (Less than 10^{-6} cm/sec) ☐ B. RELATIVELY IMPERMEABLE ($10^{-4} - 10^{-6}$ cm/sec) ■ C. RELATIVELY PERMEABLE ($10^{-2} - 10^{-4}$ cm/sec) ☐ D. VERY PERMEABLE (Greater than 10^{-2} cm/sec)

03 DEPTH TO BEDROCK	04 DEPTH OF CONTAMINATED SOIL ZONE	05 SOIL pH	
220-250 (ft)	UNK. (ft)	UNK.	

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE: SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
2.0 (in)	2.2 (in)	30 %	All directions	6.2 %

09 FLOOD POTENTIAL
SITE IS IN N/A YEAR FLOODPLAIN

10
N/A ☐ SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTUARINE	OTHER
A. N/A (mi)	B. 1.3 (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species)
_____ (mi)
ENDANGERED SPECIES: None known

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL/INDUSTRIAL	RESIDENTIAL AREAS; NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS: PRIME AG LAND	AG LAND
A. 0.2 (mi)	B. 0.15 (mi)	C. 1.0 (mi)	D. 0.2 (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

See Appendix A

VII. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

E&E, Inc. (FIT) site inspection.
E&E, Inc. (FIT) files.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 6 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
MI	000265066

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER Monitoring Wells	8	TCL: IT Corporation, Cerrito, CA TAL: Enseco/Rocky Mountain Analytical, Arvada, CO	Presently Available
SURFACE WATER			
WASTE			
AIR			
RUNOFF			
SPILL			
SOIL	10	TCL: IT Corporation, Cerrito, CA TAL: Enseco/Rocky Mountain Analytical, Arvada, CO.	Presently Available
VEGETATION			
OTHER Residential Wells	5	TCL: Compuchem Laboratories, Research Triangle Park, NC TAL: Nanco Laboratories, Inc.	Presently Available

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS
OVA 128	20-30 ppm of methane in the breathing zone at some locations. >1000 ppm of methane over the vents.
Oxygen Meter	No readings different than background except over methane vents.
Explosimeter	No readings above background except over methane vents
Radiation MiniAlert	No readings above background.
Hydrogen Cyanide Detector	Noreadings above background.

IV. PHOTOGRAPHS AND MAPS

01 TYPE ■ GROUND ☐ AERIAL — 02 IN CUSTODY OF E&E, Inc. (FIT) (Name of organization or individual)

03 MAPS ■ YES ☐ NO — 04 LOCATION OF MAPS E&E, Inc (FIT) files.

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

Determination of groundwater flow - water level measurements

Monitoring Well	U.S.G.S Top of Casing (Feet)	Depth to Water (Feet)	Water elevation (feet)
MW53	894.35	22.01	872.34
MW54	913.05	36.30	876.75
MW55	893.36	28.82	864.54
MW56	868.10	25.79	842.31
MW70	897.63	51.71	845.92
MW74	880.57	11.82	868.75
TW03	897.63	36.32	861.31

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

E&E, Inc. (FIT) site inspection.

E&E, Inc. (FIT) files.

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 7 - OWNER INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
MI	D 000265066

II. CURRENT OWNER(S)

01 NAME	02 D+B NUMBER	08 NAME (PARENT COMPANY, if applicable)	09 D+B NUMBER
Kent County		N/A	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE
[redacted]			

05 CITY	06 STATE	07 ZIP CODE	12 CITY	13 STATE	14 ZIP CODE
[redacted]					

01 NAME	02 D+B NUMBER	08 NAME	09 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	12 CITY	13 STATE	14 ZIP CODE

01 NAME	02 D+B NUMBER	08 NAME	09 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	12 CITY	13 STATE	14 ZIP CODE

01 NAME	02 D+B NUMBER	08 NAME	09 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	12 CITY	13 STATE	14 ZIP CODE

III. PREVIOUS OWNER(S) (List most recent first) / IV. REALTY OWNER(S) (If applicable; list most recent first)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
Local Farmers		Kent County	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
		[redacted]	

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE
			[redacted]		

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	05 CITY	06 STATE	07 ZIP CODE

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

E&E, Inc (FIT) site inspection.
E&E, Inc. (FIT) Files.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 8 - OPERATOR INFORMATION

I. IDENTIFICATION
01 STATE: MI | 02 SITE NUMBER: A0002650066

II. CURRENT OPERATOR (Provide if different from owner)

01 NAME	02 D+B NUMBER
Jerry Powell	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER
1984-present	Kent County

OPERATOR'S PARENT COMPANY (If applicable)

10 NAME	11 D+B NUMBER
Kent County Department of Public Works	

[redacted]

III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner)

PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)

01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER
Lee Bartlett		Same as above	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD
1980 1984	Kent County

01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER
Curt Kempannein		Same as above	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD
1977-1980	Kent County

01 NAME	02 D+B NUMBER	10 NAME	11 D+B NUMBER
Bob Scott		Same as above	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

05 CITY	06 STATE	07 ZIP CODE	14 CITY	15 STATE	16 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD
1976-77	Kent County

IV. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

E&E, Inc (FIT) site inspection.
E&E, Inc. (FIT) Files.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
MI	D000726501066

II. ON-SITE GENERATOR

01 NAME	02 D+B NUMBER	
Kent County Dept. Public Works		
[redacted]	04 SIC CODE	
[redacted]		

III. OFF-SITE GENERATOR(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
UNK.			
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY / 06 STATE / 07 ZIP CODE		05 CITY / 06 STATE / 07 ZIP CODE	
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY / 06 STATE / 07 ZIP CODE		05 CITY / 06 STATE / 07 ZIP CODE	

IV. TRANSPORTER(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
UNK.			
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY / 06 STATE / 07 ZIP CODE		05 CITY / 06 STATE / 07 ZIP CODE	
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY / 06 STATE / 07 ZIP CODE		05 CITY / 06 STATE / 07 ZIP CODE	

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

E&E, Inc. (FIT) site inspection.
E&E, Inc. (FIT) Files.

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
MI	D000265066

II. PAST RESPONSE ACTIVITIES

01 ☐ A. WATER SUPPLY CLOSED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ C. PERMANENT WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ D. SPILLED MATERIAL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ E. CONTAMINATED SOIL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ F. WASTE REPACKAGED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ G. WASTE DISPOSED ELSEWHERE — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ H. ON SITE BURIAL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ I. IN SITU CHEMICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ J. IN SITU BIOLOGICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ K. IN SITU PHYSICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ L. ENCAPSULATION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ M. EMERGENCY WASTE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ N. CUTOFF WALLS — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ O. EMERGENCY DIKING/SURFACE WATER DIVERSION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ P. CUTOFF TRENCHES/SUMP — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

01 ☐ Q. SUBSURFACE CUTOFF WALL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
N/A

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION
01 STATE: MI | 02 SITE NUMBER: D000265066

II PAST RESPONSE ACTIVITIES (Continued)

01 ☐ R. BARRIER WALLS CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION: N/A

01 ■ S. CAPPING/COVERING — 02 DATE _____ — 03 AGENCY MDNR
04 DESCRIPTION: Capping of the landfill was completed before the landfill reached the proposed final grade. This has delayed the landfill gas collection system.

01 ☐ T. BULK TANKAGE REPAIRED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION: N/A

01 ☐ U. GROUT CURTAIN CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION: N/A

01 ☐ V. BOTTOM SEALED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION: N/A

01 ☐ W. GAS CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION: N/A

01 ☐ X. FIRE CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION: N/A

01 ■ Y. LEACHATE TREATMENT — 02 DATE _____ — 03 AGENCY MDNR
04 DESCRIPTION: Leachate is treated with caustic soda to precipitate out the metal hydroxides before disposal in the Grand Rapids WWTP.

01 ☐ Z. AREA EVACUATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION: N/A

01 ☐ 1. ACCESS TO SITE RESTRICTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION: N/A

01 ☐ 2. POPULATION RELOCATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION: N/A

01 ■ 3. OTHER REMEDIAL ACTIVITIES — 02 DATE _____ — 03 AGENCY MDNR
04 DESCRIPTION:
Occaisionally, divers must be sent down into the leachate manholes to remove blockages that occur as calcium carbonate and iron form precipitates which clog the leachate collection pipes, causing the leachate to back up and flow over the top of the liner.

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

E&E, Inc. (FIT) site inspection.
E&E, Inc. (FIT) files.

EPA FORM 2070-13 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 11 - ENFORCEMENT INFORMATION

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
MI	000826506

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION ■ YES ☐ NO

02 DESCRIPTION OF FEDERAL, STATE, LOCAL REGULATORY/ENFORCEMENT ACTION

The MDNR ordered early closure of the site due to public pressure and ordered the County to spray foam on the raw leachate pond to control odors.

III. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

E&E, Inc. (FIT) site inspection
E&E, Inc. (FIT) files.

EPA FORM 2070-13 (7-81)

C

APPENDIX C

FIT SITE PHOTOGRAPHS

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Land Fill PAGE 1 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-063 PAN: FMI03105B

DATE: >10/25/88

TIME: >1255

DIRECTION OF PHOTOGRAPH:
> NE

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
>S. Bunsen

SAMPLE ID (if applicable):
> S1

DESCRIPTION: > S1

>

DATE: >10/25/88

TIME: >1255

DIRECTION OF PHOTOGRAPH:
> N

WEATHER CONDITIONS:
>40°F

>Overcast

PHOTOGRAPHED BY:
> S. Bunsen

SAMPLE ID (if applicable):
> S1

DESCRIPTION: >S1 Background Reference

>

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Land Fill PAGE 2 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-063 PAN: FMI 03105B

DATE: >10/25/88

TIME: >1310

DIRECTION OF PHOTOGRAPH:
> NE

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
>S. Bunsen

SAMPLE ID (if applicable):
> S2

DESCRIPTION: > S2

>

DATE: >10/25/88

TIME: > 1310

DIRECTION OF PHOTOGRAPH:
> N

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
> S. Bunsen

SAMPLE ID (if applicable):
> S2

DESCRIPTION: > S2 background reference

>

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Landfill PAGE 3 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-063 PAN: FMI03105B

DATE: >10/25/88

TIME: >1320

DIRECTION OF PHOTOGRAPH:
> NE

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
>S. Bunsen

SAMPLE ID (if applicable):
> S3

DESCRIPTION: > S3

>

DATE: >10/25/88

TIME: >1320

DIRECTION OF PHOTOGRAPH:
> N

WEATHER CONDITIONS:
>40°F

>Overcast

PHOTOGRAPHED BY:
>S. Bunsen

SAMPLE ID (if applicable):
> S3

DESCRIPTION: >S3 background reference

>

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Landfill PAGE 4 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-063 PAN: FMI031058

DATE: >10/25/88

TIME: >1335

DIRECTION OF PHOTOGRAPH:
> E

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
>S. Bunsen

SAMPLE ID (if applicable):
> S4

DESCRIPTION: > S4

>

DATE: >10/25/88

TIME: >1335

DIRECTION OF PHOTOGRAPH:
> E

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
> S. Bunsen

SAMPLE ID (if applicable):
> S4

DESCRIPTION: >S4 background reference

>

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Land Fill PAGE 5 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-063 PAN: FMI031055B

DATE: >10/25/88

TIME: >1350

DIRECTION OF PHOTOGRAPH:
> N

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
>S. Bunsen

SAMPLE ID (if applicable):
> S5

DESCRIPTION: > S5

>

DATE: >10/25/88

TIME: >1350

DIRECTION OF PHOTOGRAPH:
> N

WEATHER CONDITIONS:
>40°F

>Overcast

PHOTOGRAPHED BY:
> S. Bunsen

SAMPLE ID (if applicable):
> S5

DESCRIPTION: > S5 background reference

>

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Land Fill PAGE 6 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-063 PAN: FMI03105B

DATE: >10/25/88

TIME: >1400

DIRECTION OF PHOTOGRAPH:
> S

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
>S. Bunsen

SAMPLE ID (if applicable):
> S6

DESCRIPTION: > S6

>

DATE: >10/25/88

TIME: > 1400

DIRECTION OF PHOTOGRAPH:
> S

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
> S. Bunsen

SAMPLE ID (if applicable):
> S6

DESCRIPTION: > S6 background reference

>

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Land Fill PAGE 7 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-063 PAN: FMI03105B

DATE: >10/25/88

TIME: > 1410

DIRECTION OF PHOTOGRAPH:
> S

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
>S. Bunsen

SAMPLE ID (if applicable):
> S7

DESCRIPTION: > S7

>

DATE: >10/25/88

TIME: > 1410

DIRECTION OF PHOTOGRAPH:
> S

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
> S. Bunsen

SAMPLE ID (if applicable):
> S7

DESCRIPTION: > S7 background reference

>

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Landfill PAGE 8 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-063 PAN: FMI031058

DATE: >10/25/88

TIME: >1435

DIRECTION OF PHOTOGRAPH:
> N

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
>S. Bunsen

SAMPLE ID (if applicable):
> S8

DESCRIPTION: > S8

>

DATE: >10/25/88

TIME: > 1435

DIRECTION OF PHOTOGRAPH:
> N

WEATHER CONDITIONS:
>40°F

>Overcast

PHOTOGRAPHED BY:
> S. Bunsen

SAMPLE ID (if applicable):
> S8

DESCRIPTION: >S8 background reference

>

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Land Fill PAGE 9 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-063 PAN: FMI03105B

DATE: >10/25/88

TIME: >1431

DIRECTION OF PHOTOGRAPH:
> E

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
>S. Bunsen

SAMPLE ID (if applicable):
> S9

DESCRIPTION: > S9

>

DATE: >10/25/88

TIME: >1431

DIRECTION OF PHOTOGRAPH:
> E

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
> S. Bunsen

SAMPLE ID (if applicable):
> S9

DESCRIPTION: > S9 background reference

>

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Land Fill PAGE 10 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-063 PAN: FMI031055B

DATE: >10/25/88

TIME: > 1435

DIRECTION OF PHOTOGRAPH:
> N

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
>S. Bunsen

SAMPLE ID (if applicable):
> S10

DESCRIPTION: > S10

>

DATE: >10/25/88

TIME: > 1435

DIRECTION OF PHOTOGRAPH:
> N

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
> S. Bunsen

SAMPLE ID (if applicable):
> S10

DESCRIPTION: > S10 background reference

>

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Landfill PAGE 16 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-063 PAN: FMI0310SB

DATE: > 10/26/88

TIME: > 1540

DIRECTION OF PHOTOGRAPH: > E

WEATHER CONDITIONS: > 40°F

> Overcast

PHOTOGRAPHED BY: > S. Bunsen

SAMPLE ID (if applicable): > TW 03

DESCRIPTION: > (Monitoring well) TW03

>

DATE: > 10/26/88

TIME: > 1540

DIRECTION OF PHOTOGRAPH: > E

WEATHER CONDITIONS: > 40°F

> Overcast

PHOTOGRAPHED BY: > S. Bunsen

SAMPLE ID (if applicable): > TW03

DESCRIPTION: > TW03 background reference

>

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Land Fill PAGE 17 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-063 PAN: FMI03105B

DATE: >10/26/88

TIME: >1550

DIRECTION OF PHOTOGRAPH:
> NE

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
>S. Bunsen

SAMPLE ID (if applicable):
> MW53

DESCRIPTION: >MW53

>

DATE: >10/26/88

TIME: >1550

DIRECTION OF PHOTOGRAPH:
> E

WEATHER CONDITIONS:
>40°F

>Overcast

PHOTOGRAPHED BY:
> S. Bunsen

SAMPLE ID (if applicable):
> MW53

DESCRIPTION: > MW53 background reference

>

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Landfill PAGE 18 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-063 PAN: FMI031055B

DATE: >10/26/88

TIME: >1620

DIRECTION OF PHOTOGRAPH:
> E

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
>S. Bunsen

SAMPLE ID (if applicable):
> MW54

DESCRIPTION: > MW 54

>

DATE: >10/26/88

TIME: >1620

DIRECTION OF PHOTOGRAPH:
> NE

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
> S. Bunsen

SAMPLE ID (if applicable):
> MW54

DESCRIPTION: > MW54 background reference

>

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Land Fill PAGE 19 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-063 PAN: FMI031058

DATE: >10/26/88

TIME: >1855

DIRECTION OF PHOTOGRAPH:
> S

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
>S. Bunsen

SAMPLE ID (if applicable):
> MW55

DESCRIPTION: >MW55

>

DATE: >10/26/88

TIME: >1855

DIRECTION OF PHOTOGRAPH:
> S

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
> S. Bunsen

SAMPLE ID (if applicable):
> MW55

DESCRIPTION: >MW55 background reference

>

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Landfill PAGE 20 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-063 PAN: FMI031DSB

DATE: >10/26/88

TIME: > 1645

DIRECTION OF PHOTOGRAPH:
> SE

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
>S. Bunsen

SAMPLE ID (if applicable):
> MW56

DESCRIPTION: > MW56

>

DATE: >10/26/88

TIME: > 1645

DIRECTION OF PHOTOGRAPH:
> E

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
> S. Bunsen

SAMPLE ID (if applicable):
> MW56

DESCRIPTION: > MW56 background reference

>

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Land Fill PAGE 21 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-063 PAN: FMI 0310SB

DATE: >10/26/88

TIME: >1330

DIRECTION OF PHOTOGRAPH:
> S

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
>S. Bunsen

SAMPLE ID (if applicable):
> MW62

DESCRIPTION: > MW62 (pumping groundwater into leachate lagoon)

>

DATE: >10/26/88

TIME: >1330

DIRECTION OF PHOTOGRAPH:
> SE

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
> S. Bunsen

SAMPLE ID (if applicable):
> MW62

DESCRIPTION: > MW62 (background reference)

>

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Land Fill PAGE 22 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-0163 PAN: FMI031058

DATE: >10/26/88

TIME: >1845

DIRECTION OF PHOTOGRAPH:
> W

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
>S. Bunsen

SAMPLE ID (if applicable):
> MW70

DESCRIPTION: > MW70

>

DATE: >10/26/88

TIME: >1845

DIRECTION OF PHOTOGRAPH:
> W

WEATHER CONDITIONS:
>40°F

>Overcast

PHOTOGRAPHED BY:
> S. Bunsen

SAMPLE ID (if applicable):
> MW70

DESCRIPTION: > MW70 background reference

>

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield LandFill PAGE 23 OF 34

U.S. EPA ID: MID 000 265 066 TDD: F05-8711-063 PAN: FMI0310SB

DATE: >10/26/88

TIME: >1830

DIRECTION OF PHOTOGRAPH: > W

WEATHER CONDITIONS: >~40°F, overcast

PHOTOGRAPHED BY: >S. Bunsen

SAMPLE ID (if applicable): > MW74

DESCRIPTION: > MW74

>

>

>

>

>

DATE: >10/26/88

TIME: >1830

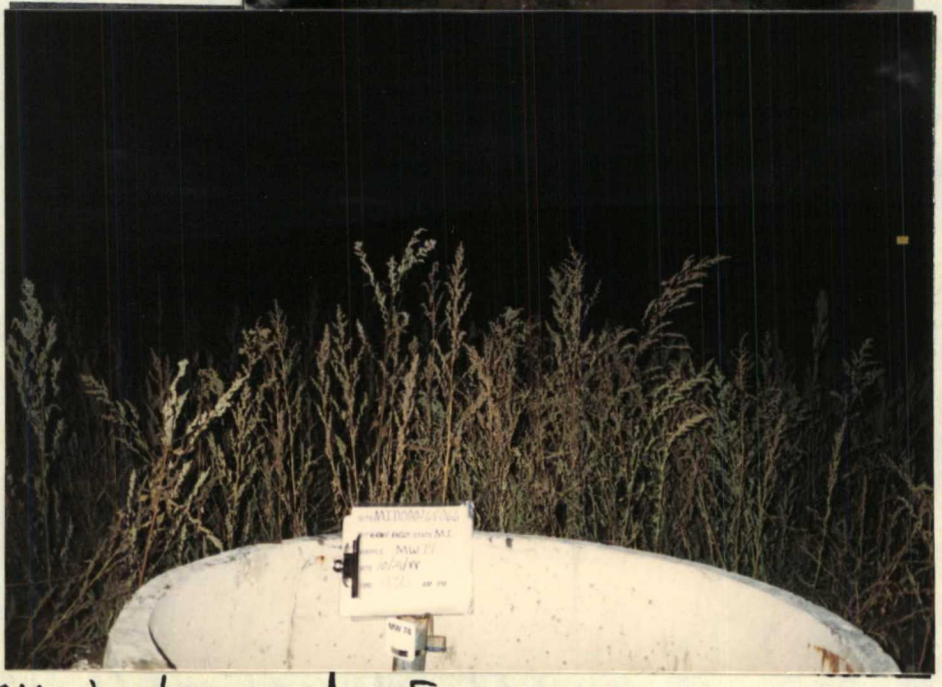
DIRECTION OF PHOTOGRAPH: > W

WEATHER CONDITIONS: > 40°F

> Overcast

PHOTOGRAPHED BY: > S. Bunsen

SAMPLE ID (if applicable): > MW74



DESCRIPTION: > MW74 background reference

>

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Landfill PAGE 24 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-063 PAN: FMI0310SB

DATE: >10/26/88 TIME: >1610 DIRECTION OF PHOTOGRAPH: >NW-N PHOTOGRAPHED BY: > S. Bunsen

WEATHER CONDITIONS: > 40° F, overcast SAMPLE ID (if applicable): >

DESCRIPTION: >Scale house and vehicle garage at far right, vacant house and garage at far left

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Land Fill PAGE 25 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-063 PAN: FMI03105B

DATE: >10/26/88

TIME: >1535

DIRECTION OF PHOTOGRAPH:
> NE

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
>S. Bunsen

SAMPLE ID (if applicable):
>

DESCRIPTION: > Leachate lagoons and wastewater treatment > building

DATE: >10/26/88

TIME: >1535

DIRECTION OF PHOTOGRAPH:
> N

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
> S. Bunsen

SAMPLE ID (if applicable):
>

DESCRIPTION: >treated leachate pond

>

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County PlainField LandFill PAGE 26 OF 34

U.S. EPA ID: MID000265066 TDD: F05-8711-063 PAN: FMI0310SB

DATE: >10/26/88

TIME: >1530

DIRECTION OF PHOTOGRAPH: > NE

WEATHER CONDITIONS: > 40°F

>Overcast

PHOTOGRAPHED BY: > S. Bunsen

SAMPLE ID (if applicable): >

DESCRIPTION: > untreated leachate lagoon

>

DATE: >10/26/88

TIME: >1530

DIRECTION OF PHOTOGRAPH: > N

WEATHER CONDITIONS: > 40°F, overcast

PHOTOGRAPHED BY: >S. Bunsen

SAMPLE ID (if applicable): >

DESCRIPTION: >wastewater >treatment trailer >and dumpster Full > of filter cake > sludge >

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Land Fill PAGE 27 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-063 PAN: FMI031058

DATE: >10/26/88

TIME: >1530

DIRECTION OF PHOTOGRAPH:
> NE

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
>S. Bunsen

SAMPLE ID (if applicable):
>

DESCRIPTION: > closeup view of untreated leachate lagoon

>

DATE: >10/26/88

TIME: > 1530

DIRECTION OF PHOTOGRAPH:
> E

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
> S. Bunsen

SAMPLE ID (if applicable):
>

DESCRIPTION: >closeup view of treated leachate lagoon

>

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Landfill PAGE 28 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-063 PAN: FMI03105B

DATE: >10/26/88

TIME: > 1545

DIRECTION OF PHOTOGRAPH:
> N

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
>S. Bunsen

SAMPLE ID (if applicable):
>

DESCRIPTION: > Outfall 004

>

DATE: >10/26/88

TIME: > 1545

DIRECTION OF PHOTOGRAPH:
> S

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
> S. Bunsen

SAMPLE ID (if applicable):
>

DESCRIPTION: > Center under drain basin

>

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Landfill PAGE 29 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-063 PAN: FMI0310SB

DATE: >10/26/88

TIME: > 1550

DIRECTION OF PHOTOGRAPH:
> N

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
>S. Bunsen

SAMPLE ID (if applicable):
>

DESCRIPTION: > Outfall 005

>

DATE: >10/26/88

TIME: > 1550

DIRECTION OF PHOTOGRAPH:
> SE

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
> S. Bunsen

SAMPLE ID (if applicable):
>

DESCRIPTION: > Eastern underdrain basin

>

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Land Fill PAGE 30 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-063 PAN: FMI031058

DATE: >10/26/88

TIME: > 1600

DIRECTION OF PHOTOGRAPH:
> W

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
>S. Bunsen

SAMPLE ID (if applicable):
>

DESCRIPTION: >western sedimentation basin

>

DATE: >10/26/88

TIME: >1600

DIRECTION OF PHOTOGRAPH:
> S

WEATHER CONDITIONS:
>40°F

>Overcast

PHOTOGRAPHED BY:
>S. Bunsen

SAMPLE ID (if applicable):
>

DESCRIPTION: > Southern sedimentation basin

>

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Landfill PAGE 31 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-063 PAN: FMI0310SB

DATE: >10/26/88 TIME: >1605 DIRECTION OF PHOTOGRAPH: >SE-S PHOTOGRAPHED BY: > S. Bunsen

WEATHER CONDITIONS: > 40° F, overcast SAMPLE ID (if applicable): >

DESCRIPTION: > Old borrow areas southeast of the landfill

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Landfill PAGE 32 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-063 PAN: FMI0310SB

DATE: >10/26/88 TIME: >1520 DIRECTION OF PHOTOGRAPH: >NE-E PHOTOGRAPHED BY: > S. Bunsen

WEATHER CONDITIONS: > 40° F, overcast SAMPLE ID (if applicable): >

DESCRIPTION: >Old borrow areas southeast of the landfill

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Land Fill PAGE 33 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-063 PAN: FMI031058

DATE: >10/26/88

TIME: > 1615

DIRECTION OF PHOTOGRAPH:
> S

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
>S. Bunsen

SAMPLE ID (if applicable):
>

DESCRIPTION: >Leachate manholes

>

DATE: >10/26/88

TIME: >1620

DIRECTION OF PHOTOGRAPH:
> E

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
> S. Bunsen

SAMPLE ID (if applicable):
>

DESCRIPTION: >Surveyors Flag Flapping from the force
> of escaping methane in a gas field

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Kent County Plainfield Landfill PAGE 34 OF 34

U.S. EPA ID: MID 000265066 TDD: F05-8711-063 PAN: FMI0310SB

DATE: >10/24/88

TIME: >1625

DIRECTION OF PHOTOGRAPH:
> S

WEATHER CONDITIONS:
> 40°F

>Overcast

PHOTOGRAPHED BY:
>S. Bunsen

SAMPLE ID (if applicable):
>

DESCRIPTION: > Entrance to landfill

>

D

APPENDIX D

U.S. EPA TARGET COMPOUND LIST AND TARGET ANALYTE LIST QUANTITATION/DETECTION LIMITS

ROUTINE ANALYTICAL SERVICES
CONTRACT REQUIRED DETECTION AND QUANTITATION LIMITS

Contract Laboratory Program
Target Compound List
Quantitation Limits

COMPOUND	CAS #	WATER	SOIL SEDIMENT SLUDGE
Chloromethane	74-87-3	10 ug/L	10 ug/Kg
Bromomethane	74-83-9	10	10
Vinyl chloride	75-01-4	10	10
Chloroethane	75-00-3	10	10
Methylene chloride	75-09-2	5	5
Acetone	67-64-1	10	5
Carbon disulfide	75-15-0	5	5
1,1-dichloroethene	75-35-4	5	5
1,1-dichloroethane	75-34-3	5	5
1,2-dichloroethene (total)	540-59-0	5	5
Chloroform	67-66-3	5	5
1,2-dichloroethane	107-06-2	5	5
2-butanone (MEK)	78-93-3	10	10
1,1,1-trichloroethane	71-55-6	5	5
Carbon tetrachloride	56-23-5	5	5
Vinyl acetate	108-05-4	10	10
Bromodichloromethane	75-27-4	5	5
1,2-dichloropropane	78-87-5	5	5
cis-1,3-dichloropropene	10061-01-5	5	5
Trichloroethene	79-01-6	5	5
Dibromochloromethane	124-48-1	5	5
1,1,2-trichloroethane	79-00-5	5	5
Benzene	71-43-2	5	5
Trans-1,3-dichloropropene	10061-02-6	5	5
Bromoform	75-25-2	5	5
4-Methyl-2-pentanone	108-10-1	10	10
2-Hexanone	591-78-6	10	10
Tetrachloroethene	127-18-4	5	5
Tolene	108-88-3	5	5
1,1,2,2-tetrachloroethane	79-34-5	5	5
Chlorobenzene	108-90-7	5	5
Ethyl benzene	100-41-4	5	5
Styrene	100-42-5	5	5
Xylenes (total)	1330-20-7	5	5

Table A --
Contract Laboratory Program
Target Compound List
Semivolatiles Quantitation Limits

COMPOUND	CAS #	WATER	SOIL SEDIMENT SLUDGE
Phenol	108-95-2	10 ug/L	330 ug/Kg
bis(2-Chloroethyl) ether	111-44-4	10	330
2-Chlorophenol	95-57-8	10	330
1,3-Dichlorobenzene	541-73-1	10	330
1,4-Dichlorobenzene	106-46-7	10	330
Benzyl Alcohol	100-51-6	10	330
1,2-Dichlorobenzene	95-50-1	10	330
2-Methylphenol	95-48-7	10	330
bis(2-Chloroisopropyl) ether	108-60-1	10	330
4-Methylphenol	106-44-5	10	330
N-Nitroso-di-n-dipropylamine	621-64-7	10	330
Hexachloroethane	67-72-1	10	330
Nitrobenzene	98-95-3	10	330
Isophorone	78-59-1	10	330
2-Nitrophenol	88-75-5	10	330
2,4-Dimethylphenol	105-67-9	10	330
Benzoic Acid	65-85-0	50	1600
bis(2-Chloroethoxy) methane	111-91-1	10	330
2,4-Dichlorophenol	120-83-2	10	330
1,2,4-Trichlorobenzene	120-82-1	10	330
Naphthalene	91-20-3	10	330
4-Chloroaniline	106-47-8	10	330
Hexachlorobutadiene	87-68-3	10	300
4-Chloro-3-methylphenol	59-50-7	10	330
2-Methylnaphthalene	91-57-6	10	330
Hexachlorocyclopentadiene	77-47-4	10	330
2,4,6-Trichlorophenol	88-06-2	10	330
2,4,5-Trichlorophenol	95-95-4	50	1600
2-Chloronaphthalene	91-58-7	10	330
2-Nitroaniline	88-74-4	50	1600
Dimethylphthalate	131-11-3	10	330
Acenaphthylene	208-96-8	10	330
2,6-Dinitrotoluene	606-20-2	10	330
3-Nitroaniline	99-09-2	50	1600
Acenaphthene	83-32-9	10	330
2,4-Dinitrophenol	51-28-5	50	1600
4-Nitrophenol	100-02-7	50	1600
Dibenzofuran	132-64-9	10	330
2,4-Dinitrotoluene	121-14-2	10	330
Diethylphthalate	84-66-2	10	330
4-Chlorophenyl-phenyl ether	7005-72-3	10	330

Table A
Contract Laboratory Program
Target Compound List
Semivolatiles Quantitation Limits

COMPOUND	CAS #	WATER	SOIL SLUDGE SEDIMENT
Fluorene	86-73-7	10 ug/L	330 ug/Kg
4-Nitroaniline	100-01-6	50	1600
4,6-Dinitro-2-methylphenol	534-52-1	50	1600
N-nitrosodiphenylamine	86-30-6	10	330
4-Bromophenyl-phenylether	101-55-3	10	330
Hexachlorobenzene	118-74-1	10	330
Pentachlorophenol	87-86-5	50	1600
Phenanthrene	85-01-8	10	330
Anthracene	120-12-7	10	330
Di-n-butylphthalate	84-74-2	10	330
Fluoranthene	206-44-0	10	330
Pyrene	129-00-0	10	330
Butylbenzylphthalate	85-68-7	10	330
3,3'-Dichlorobenzidine	91-94-1	20	660
Benzo(a)anthracene	56-55-3	10	330
Chrysene	218-01-9	10	330
bis(2-Ethylhexyl)phthalate	117-81-7	10	330
Di-n-octylphthalate	117-84-0	10	330
Benzo(b)fluoranthene	205-99-2	10	330
Benzo(k)fluoranthene	207-08-9	10	330
Benzo(a)pyrene	50-32-8	10	330
Indeno(1,2,3-cd)pyrene	193-39-5	10	330
Dibenz(a,h)anthracene	53-70-3	10	330
Benzo(g,h,i)perylene	191-24-2	10	330

Table A
Contract Laboratory Program
Target Compound List
Pesticide and PCB Quantitation Limits

COMPOUND	CAS #	WATER	SOIL SEDIMENT SLUDGE
alpha-BHC	319-84-6	0.05 ug/L	8 ug/Kg
beta-BHC	319-85-7	0.05	8
delta-BHC	319-86-8	0.05	8
gamma-BHC (Lindane)	58-89-9	0.05	8
Heptachlor	76-44-8	0.05	8
Aldrin	309-00-2	0.05	8
Heptachlor epoxide	1024-57-3	0.05	8
Endosulfan I	959-98-8	0.05	8
Dieldrin	60-57-1	0.10	16
4,4'-DDE	72-55-9	0.10	16
Endrin	72-20-8	0.10	16
Endosulfan II	33213-65-9	0.10	16
4,4'-DDD	72-54-8	0.10	16
Endosulfan sulfate	1031-07-8	0.10	16
4,4'-DDT	50-29-3	0.10	16
Methoxychlor (Mariate)	72-43-5	0.5	80
Endrin ketone	53494-70-5	0.10	16
alpha-Chlordane	5103-71-9	0.5	80
gamma-chlordane	5103-74-2	0.5	80
Toxaphene	8001-35-2	1.0	160
AROCLOR-1016	12674-11-2	0.5	80
AROCLOR-1221	11104-28-2	0.5	80
AROCLOR-1232	11141-16-5	0.5	80
AROCLOR-1242	53469-21-9	0.5	80
AROCLOR-1248	12672-29-6	0.5	80
AROCLOR-1254	11097-69-1	1.0	160
AROCLOR-1260	11096-82-5	1.0	160

Table A
Contract Laboratory Program
Target Analyte List
Inorganic Quantitation Limits

COMPOUND	PROCEDURE	~~SOIL~~ WATER	SOIL SEDIMENT SLUDGE
Aluminum	ICP	200 ug/L	40 mg/Kg
Antimony	Furnace	60	2.4
Arsenic	Furnace	10	2
Barium	ICP	200	40
Beryllium	ICP	5	1
Cadmium	ICP	5	1
Calcium	ICP	5000	1000
Chromium	ICP	10	2
Cobalt	ICP	50	10
Copper	ICP	25	5
Iron	Icp	100	20
Lead	Furnace	5	1
Magnesium	ICP	5000	1000
Manganese	ICP	15	3
Mercury	Cold Vapor	0.2	0.008
Nickel	ICP	40	8
Potassium	ICP	5000	1000
Selenium	Furnace	5	1
Silver	ICP	10	2
Sodium	ICP	5000	1000
Thallium	Furnace	10	2
Vanadium	ICP	50	10
Zinc	ICP	20	4
Cyanide	Color	10	2

CENTRAL REGIONAL LABORATORY
DETECTION LIMITS

TABLE B
CENTRAL REGIONAL LABORATORY
VOLATILE DETECTION LIMITS

PARAMETER	CAS #	DETECTION LIMIt IN REAGENT WATER
Benzene	71-43-2	1.5 ug/L
Bromodichloromethane	75-27-4	1.5
Bromoform	75-25-2	1.5
Bromomethane	74-83-9	10
Carbon tetrachloride	56-23-5	1.5
Chlorobenzene	108-90-7	1.5
Chloroethane	75-00-3	1.5
2-Chloroethyl vinyl ether	110-75-8	1.5
Chloroform	67-66-3	1.5
Chloromethane	74-87-3	10
Dibromochloromethane	124-48-1	1.5
1,1-dichloroethane	75-34-3	1.5
1,2-dichloroethane	107-06-2	1.5
1,1-dichloroethene	75-35-4	1.5
trans-1,2-dichloroethene	156-60-5	1.5
1,2-dichloropropane	78-87-5	1.5
cis-1,3-dichlopropropene	10061-01-5	2
trans-1,3-dichloropropene	10061-02-6	1
Ethyl benzene	100-41-4	1.5
Methylene chloride*	75-09-2	1
1,1,2,2-tetrachloroethane	79-34-5	1.5
Tetrachloroethene	127-18-4	1.5
Toluene*	108-88-3	1.5
1,1,1-trichloroethane	71-55-6	1.5
1,1,2-trichloroethane	79-00-5	1.5
Trichloroethene	79-01-6	1.5
Vinyl chloride	75-01-4	10
Acrolein	107-02-8	100
Acetone*	67-64-1	75
Acrylonitrile	107-13-1	50
Carbon disulfide	75-15-0	3
2-butanone	78-93-3	(50)
Vinyl acetate	108-05-4	15
4-Methyl-2-Pentanone	108-10-1	(3)
2-Hexanone	519-78-6	(50)
Styrene	100-42-5	1
m-xylene	108-38-3	2
o-xylene**	95-47-6	
p-xylene**	106-42-3	2.5**
Total Xylene	1330-02-7	

* Common Laboratory Solvents.
Blank Limit is 5X Method Detection Limit.
( ) Values in parentheses are estimates.
Actual values are being determined at this time.
** The o-xylene and p-xylene are reported as a total of the two.

TABLE B (cont.)
CRL
SEMIVOLATILE DETECTION LIMITS

PARAMETER	CAS #	DETECTION LIMIT	BLANK LIMIT
Aniline	62-53-3	1.5 ug/L	3 ug/L
Bis(2-chloroethyl)ether	111-44-4	1.5	3
Phenol	108-95-2	2	4
2-Chlorophenol	95-57-8	2	5
1,3-Dichlorobenzene	541-73-1	2	4
1,4-Dichlorobenzene	106-46-7	2	4
1,2-Dichlorobenzene	95-50-1	2.5	5
Benzyl alcohol	100-51-6	2	5
Bis(2-chloroisopropyl) ether	39638-32-9	2.5	5
2-Methylphenol	95-48-7	1	2
Hexdachloroethane	67-72-1	2	4
N-nitrosodipropylamine	621-64-7	1.5	3
Nitrobenzene	98-95-3	2.5	5
4-Methylphenol	106-44-5	1	2
Isophorone	78-59-1	2.5	5
2-Nitrophenol	88-75-5	2	4
2,4-Dimethylphenol	105-67-9	2	4
Bis(2-chloroethoxy)methane	111-91-1	2.5	5
2,4-Dichlorophenol	120-83-2	2	4
1,2,4-Trichlorobenzene	120-82-1	2	4
Naphthalene	91-20-3	2	4
4-Chloroaniline	106-47-8	2	4
Hexachlorobutadiene	87-68-3	2.5	5
Benzoic acid	65-85-0	(30)	(60)
2-Methylnapthalene	91-57-6	2	4
4-Chloro-3-methylphenol	59-50-7	1.5	3
Hexachlorocyclopentadiene	77-47-4	2	4
2,4,6-Trichlorophenol	88-06-2	1.5	3
2,4,5-Trichlorophenol	95-95-4	1.5	3
2-Chloronapthalene	91-58-7	1.5	3
Acenapthylene	208-96-8	1.5	3
Dimethyl phthalate	131-11-3	1.5	3
2,6-Dinitrotoluene	606-20-2	1	2
Acenaphthene	83-32-9	1.5	3
3-Nitroaniline	99-09-2	2.5	5
Dibenzofuran	132-64-9	1	2
2,4-Dinitrophenol	51-28-5	(15)	(30)
2,4-Dinitrotoluene	121-14-2	1	2
cont.			

TABLE B (Cont.)
CRL
SEMIVOLATILE DETECTION LIMITS

PARAMETER	CAS #	DETECTION LIMIT	BLANK (a) LIMIT
Fluorene	86-73-7	1 ug/L	2 ug/L
4-Nitrophenol	100-02-7	1.5	3
4-Chlorophenyl phenyl ether	7005-72-3	1	2
Diethylphthalate	84-66-2	1	2
4,6-dinitro-2-methylphenol	534-52-1	(15)	(30)
1,2-Diphenylhydrazine	122-66-7	1	2
n-Nitrosodiphenylamine *	86-30-6		
Diphenylamine *	122-39-4	1.5	3
4-Nitroaniline	100-01-6	3	6
4-Bromophenyl-phenylether	101-55-3	1.5	3
Hexachlorobenzene	118-74-1	1.5	3
Pentachlorophenol	87-86-5	2	4
Phenanthrene	85-01-8	1	2
Anthracene	120-12-7	2.5	5
Di-n-butylphthalate	84-74-2	2	4
Fluoranthene	206-44-0	1.5	3
Pyrene	129-00-0	1.5	3
Butylbenzylphthalate	85-68-7	3.5	7
Chrysene **	218-01-9		
Benzo(a)anthracene **	56-55-3	1.5	3
bis(2-Ethylhexyl)phthalate	117-81-7	1	2
Di-n-octyl phthalate	117-84-0	1.5	3
Benzo(b)fluoranthene ***	205-99-2		
Benzo(k)fluoranthene ***	207-08-9	1.5	3
Benzo(a)pyrene	50-32-8	2	4
Indeno(1,2,3-cd)pyrene	193-39-5	3.5	7
Dibenzo(a,h)anthracene	53-70-3	2.5	5
Benzo(g,h,i)perylene	191-24-2	4	8
2-Nitroaniline	88-74-4	1	2

cont.

9/87

* These two parameters are reported as a total.
** These two parameters are reported as a total.
*** These two parameters are reported as a total.
(a) If the blank limit is exceeded, the sample is reextracted and rerun.
( ) Values in parentheses are estimates.
The actual values are being determined at this time.

Note: Limits are for reagent water.

TABLE B (Cont.)
CRL
PESTICIDE AND PCB DETECTION LIMITS

PARAMETER	CAS #	DETECTION LIMIT
Aldrin	309-00-2	0.005 ug/L
alpha BHC	319-84-6	(0.010)
beta BHC	319-85-7	(0.005)
delta BHC	319-86-8	(0.005)
gama BHC (Lindane)	58-89-9	0.005
Chlordane	57-74-8	(0.020)
4,4'-DDD	72-54-8	(0.020)
4,4'-DDE	72-55-9	(0.005)
4,4'-DDT	50-29-3	0.020
Dieldrin	60-57-1	0.010
Endosulfan I	959-98-8	0.010
Endosulfan II	33213-65-9	0.010
Endosulfan sulfate	1031-07-8	(0.10)
Endrin	72-20-8	0.010
Endrin aldehyde	7421-93-4	(0.030)
Endrin ketone	53494-70-5	(0.030)
Heptachlor	76-44-8	0.030
Heptachlor epoxide	1024-57-3	0.005
4,4'-Methoxychlor	72-43-5	0.020
Toxaphene	8001-35-2	(0.25)
PCB-1242	53469-21-9	(0.10)
PCB-1248	12672-29-6	(0.10)
PCB-1254	11097-69-1	(0.10)
PCB-1260	11096-82-5	(0.10)

( ) Values in parentheses are estimates.
Actual values are being determined at this time.

Note: Limits are for reagent vater.

TABLE B (Cont.)
CRL
INORGANIC DETECTION LIMITS

JANUARY 1986

COMPOUND	PROCEDURE	DETECTION LIMITS	RANGE	UNITS
Aluminum	ICP	80	80 to 1,000,000	ug/L
Antimony	Furnace	2	2 to 30	ug/L
Arsenic	Furnace	2	2 to 30	ug/L
Barium	ICP	6	6 to 20,000	ug/L
Beryllium	ICP	1	1 to 20,000	ug/L
Boron	ICP	80	80 to 20,000	ug/L
Cadmium	ICP	10	10 to 20,000	ug/L
Cadmium	Furnace	0.2	0.2 to 2	ug/L
calcium	ICP	0.5	0.5 to 1,000	mg/L
Chromium	ICP	8	8 to 20,000	ug/L
Cobalt	ICP	6	6 to 20,000	ug/L
Copper	ICP	6	6 to 20,000	ug/L
iron	ICP	80	80 to 1,000,000	ug/L
Lead	Furnace	2	2 to 30	ug/L
Lead	ICP	70	70 to 20,000	ug/L
Lithium	ICP	10	10 to 20,000	ug/L
Magnesium	ICP	0.1	0.1 to 200	mg/L
Maganese	ICP	5	5 to 20,000	ug/L
Mercury	Cold vapor	0.1	0.1 to 2	ug/L
Molybdenum	ICP	15	15 to 20,000	ug/L
Nickel	ICP	15	15 to 20,000	ug/L
Potassium	ICP	5	5 to 1,000	mg/L
Selenium	Furnace	2	2 to 30	ug/L
Silver	ICP	6	6 to 10,000	ug/L
Sodium	ICP	1	1 to 1,000	mg/L
Strontium	ICP	10	10 to 20,000	ug/L
Sulfide	Titration	1	< 1	mg/L
Sulfide	Color	0.05	< 1	mg/L
Thallium	Furnace	2	2 to 30	ug/L
Titanium	ICP	25	25 TO 20,000	UG/L
Tin	ICP	40	40 to 20,000	ug/L
Vanadium	ICP	5	5 to 20,000	ug/L
Yttrium	ICP	5	5 to 20,000	ug/L
Zinc	ICP	40	40 to 1,000,000	ug/L
Cyanide	AA	8	8 to 200	ug/L

Note: The above list may or may not contain compounds that are routinely analyzed at CRL for low level detection limits for drinking water.

See inorganic Routine Analytical Services for related CAS #.

SPECIAL ANALYTICAL SERVICES
DETECTION LIMITS

Drinking Water Samples

TABLE C
SPECIAL ANALYTICAL SERVICES DRINKING WATER
VOLATILE QUANTITATION LIMITS

PARAMETER	CAS #	DETECTION LIMIT IN REAGENT WATER
Benzene	71-43-2	1.5 ug/L
Bromodichloromethane	74-27-4	1.5
Bromoform	75-25-2	1.5
Bromomethane	74-83-9	10
Carbon tetrachloride	56-23-5	1.5
Chlorobenzene	108-90-7	1.5
Chloroethane	75-00-3	1.5
2-Chloroethyl vinyl ether	110-75-8	1.5
Chloroform	67-66-3	1.5
Chloromethane	74-87-3	10
Dibromochloromethane	124-48-1	1.5
1,1-Dichloroethane	75-34-3	1.5
1,2-Dichloroethane	107-06-2	1.5
1,1-Dichloroethene	75-35-4	1.5
trans-1,2-Dichloroethene	156-60-5	1.5
1,2-Dichloropropane	78-87-5	1.5
cis-1,3-Dichloropropene	10061-01-5	2
trans-1,3-Dichlopropropene	10061-02-6	1
Ethyl benzene	100-41-4	1.5
Methylene chloride *	75-09-2	1
1,1,2,2-Tetrachloroethane	79-34-5	1.5
Tetrachloroethene	127-18-4	1.5
Toluene *	108-88-3	1.5
1,1,1-Trichloroethane	71-55-6	1.5
1,1,2-Trichloroethane	79-00-5	1.5
Trichloroethene	79-01-6	1.5
Vinyl chloride	75-01-4	10
Acrolein	107-02-8	100
Acetone *	67-64-1	75
Acrylonitrile	107-13-1	50
Carbon disulfide	75-15-0	3
2-Butanone	78-93-3	(50)
Vinyl acetate	108-05-4	15
4-Methyl-2-pentanone	108-10-1	(3)
2-Hexanone	519-78-6	(50)
Styrene	100-42-5	1
m-Xylene	108-38-3	2
o-Xylene **	95-47-6	
p-Xylene **	106-42-3	2.5 **
Xylene (total)	1330-02-7	

* Common laboratory solvents.
Blank limit is 5x method detection limit.
( ) Values in parentheses are estimates.
actual values are being determined at this time.
** The o-xylene and p-xylene are reported as a total of the two.

TABLE C (cont.)
SAS DRINKING WATER
SEMIVOLATILES QUANTITATION LIMITS

PARAMETER	CAS #	DETECTION LIMIT
Aniline	62-53-3	1.5 ug/l
Bis(2-chloroethyl)ether	111-44-4	1.5
Phenol	108-95-2	2
2-Chlorophenol	95-57-8	2
1,3-Dichlorobenzene	541-73-1	2
1,4-Dichlorobenzene	106-46-7	2
1,2-Dichlorobenzene	95-50-1	2.5
Benzyl alcohol	100-51-6	2
Bis(2-chloroisopropyl)ether	39638-32-9	2.5
2-Methylphenol	95-48-7	1
Hexachloroethane	67-72-1	2
n-Nitrosodipropylamine	621-64-7	1.5
Nitrobenzene	98-95-3	2.5
4-Methylphenol	88-75-5	1
Isophorone	78-59-1	2.5
2-Nitrophenol	88-75-5	2
2,4-Dimethylphenol	105-67-9	2
Bis(2-Chloroethoxy)methane	111-91-1	2.5
2,4-Dichlorophenol	120-83-2	2
1,2,4-Trichlorobenzene	120-82-1	2
Naphthalene	91-20-3	2
4-Chloroaniline	106-47-8	2
Hexachlorobutadiene	87-68-3	2.5
Benzoic Acid	65-85-0	(30)
2-Methylnapthalene	91-57-6	2
4-Chloro-3-methylphenol	59-50-7	1.5
Hexachlorocyclopentadiene	77-47-4	2
2,4,6-Trichlorophenol	88-06-2	1.5
2,4,5-Trichlorophenol	95-95-4	1.5
2-Chloronapthalene	91-58-7	1.5
Acenapthylhene	208-96-8	1.5
Dimethyl phthalate	131-11-3	1.5
2,6-Dinitrotoluene	606-20-2	1
Acenaphthene	83-32-9	1.5
3-Nitroaniline	99-09-2	2.5
Dibenzofuran	132-64-9	1
2,4-Dinitrophenol	51-28-5	(15)
2,4-Dinitrotoluene	121-14-2	1

TABLE C (Cont.)
SAS DRINKING WATER
SEMIVOLATILE QUANTITATION LIMITS

PARAMETER	CAS #	DETECTION LIMIT
Fluorene	86-73-7	1 ug/L
4-Nitrophenol	100-02-7	1.5
4-Chlorophenyl phenyl ether	7005-72-3	1
Diethyl phthalate	84-66-2	1
4,6-Dinitro-2-methylphenol	534-52-1	(15)
1,2-Diphenylhydrazine	122-66-7	1
n-Nitrosodiphenylamine *	86-30-6	
Diphenylamine *	122-39-4	1.5
4-Nitroaniline	100-01-6	3
4-Bromophenyl-phenylether	101-55-3	1.5
Hexachlorobenzene	118-74-1	1.5
Pentachlorophenol	87-86-5	2
Phenanthrene	85-01-8	1
Anthracene	120-12-7	2.5
di-n-Butyl phthalate	84-74-2	2
Fluoranthene	206-44-0	1.5
Pyrene	129-00-0	1.5
Butyl benzyl phthalate	85-68-7	3.5
Chrysene **	218-01-9	
Benzo(A)Anthracene **	56-55-3	1.5
bis(2-ethylhexyl)phthalate	117-81-7	1
di-n-Octyl phthalate	117-84-0	1.5
Benzo(b)fluoranthene ***	205-99-2	
Benzo(k)fluoranthene ***	207-08-9	1.5
Benzo(a)pyrene	50-32-8	2
Indeno(1,2,3-cd)pyrene	193-39-5	3.5
Dibenzo(a,h)anthracene	53-70-3	2.5
Benzo(g,h,i)perylene	191-24-2	4
2-Nitroaniline	88-74-4	1

* These two parameters are reported as a total.
** These two parameters are reported as a total.
*** These two parameters are reported as a total.

( ) Values in parentheses are estimates.
The actual values are being determined at this time.

Note: Limits are for reagent water.

TABLE C (Cont.)
SAS DRINKING WATER
PESTICIDE AND PCB QUANTITATION LIMITS

PARAMETER	CAS #	DETECTION LIMIT
Aldrin	309-00-2	0.005 ug/L
alpha BHC	319-84-6	(0.010)
beta BHC	319-85-7	(0.005)
delta BHC	319-86-8	(0.005)
gamma BHC (Lindane)	58-89-9	0.005
Chlordane	57-74-9	(0.020)
4,4'-DDD	72-54-8	(0.020)
4,4'-DDE	72-55-9	(0.005)
4,4'-DDT	50-29-3	0.020
Dieldrin	60-57-1	0.010
Endosulfan I	959-98-8	0.010
Endosulfan II	33213-65-9	0.010
Endosulfan sulfate	1031-07-8	(0.10)
Endrin	72-20-8	0.010
Endrin Aldehyde	7421-93-4	(0.030)
Endrin Ketone	53494-70-5	(0.030)
Heptachlor	76-44-8	0.030
Heptachlor Epoxide	1024-57-3	0.005
4,4'-Methoxychlor	72-43-5	0.020
Toxaphene	8001-35-2	(0.25)
PCB-1242	53469-21-9	(0.10)
PCB-1248	12672-29-6	(0.10)
PCB-1254	11097-69-1	(0.10)
PCB-1260	11096-82-5	(0.10)

( ) Values in parentheses are estimates.
Actual values are being determined at this time.

Note: Limits are for reagent water.

TABLE C (Cont.)
SAS DRINKING WATER
INORGANIC DETECTION LIMITS

JANUARY 1986

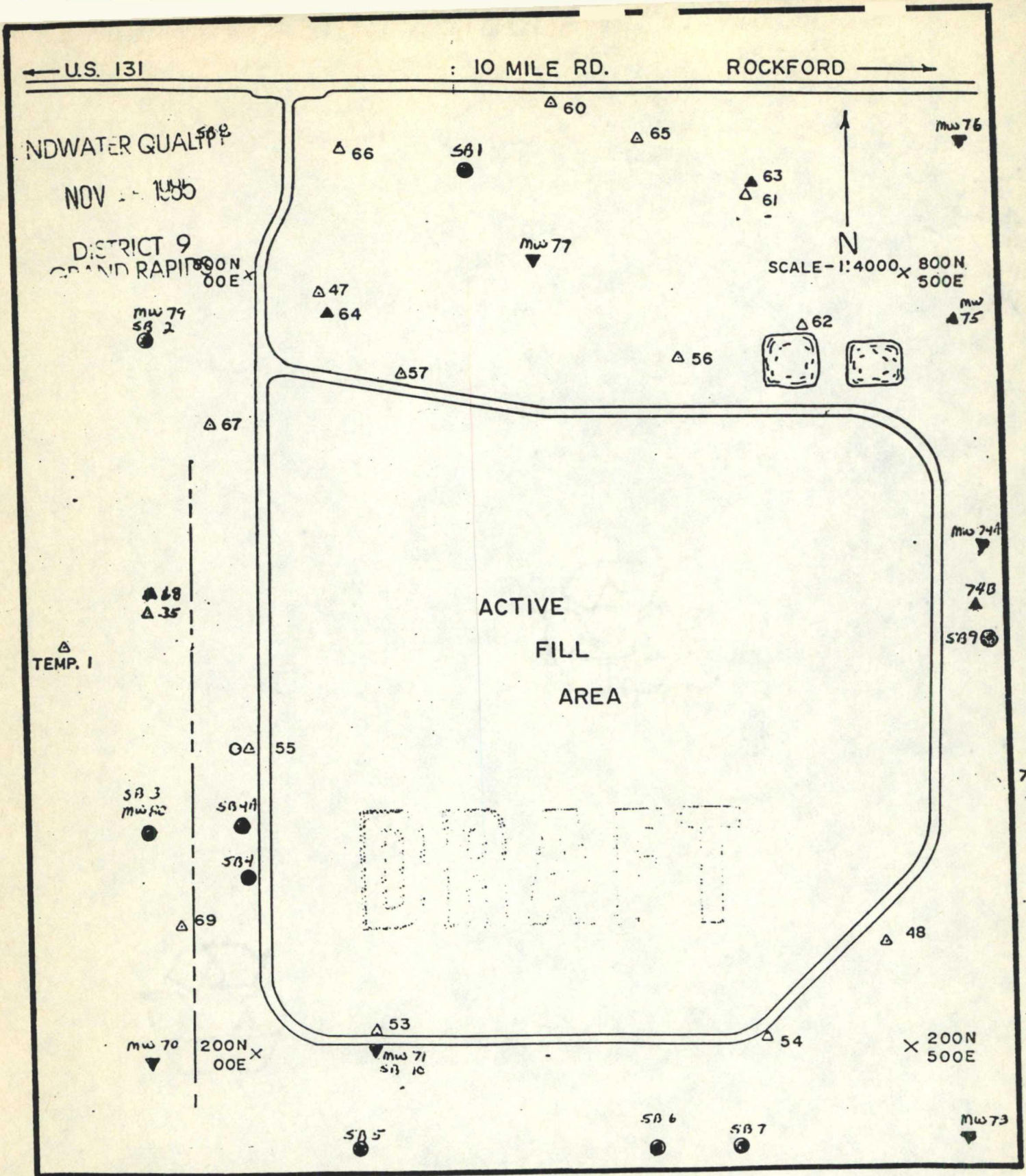
PARAMETER	PROCEDURE	DETECTION LIMIT
Aluminum	ICP	100
Antimony	GFAA	2
Arsenic	GFAA	2
Barium	ICP	50
Beryllium	ICP	5
Cadmium	ICP	10
Cadmium	GFAA	0.2
Calcium	ICP	1000
Chromium	ICP	10
Cobalt	ICP	10
Copper	ICP	10
Iron	ICP	100
Lead	GFAA	2
Magnesium	ICP	1000
Manganese	ICP	10
Mercury	Cold Vapor	0.2
Nickel	ICP	20
Potassium	ICP	2000
Selenium	GFAA	2
Silver	ICP	5
Sodium	ICP	1000
Thallium	GFAA	2
Tin	ICP	40
Vanadium	ICP	10
Zinc	ICP	20
Cyanide	Colorimetric	5.0

Note: The above list may or may not contain compounds that are routinely analyzed at CRL for low level detection limits for drinking water.

See inorganic Routine Analytical Services (RAS) for related CAS #.

APPENDIX E

ON-SITE SOIL BORING AND MONITORING WELL LOGS



PROPOSED:

▽ SHALLOW WELL

■ DEEP WELL

⊙ SOIL BORING

——--—— ℄ OF RESISTIVITY STUDY AREA

EXISTING:

△ SHALLOW WEL

▲ DEEP WELL

NORTH KENT LANDFILL

PHASE II - PLAN OF STUDY SKETCH

copy #3 of 3

BORING NUMBER SB-1 TOTAL DEPTH 9.76m S.W.L. (BGL) _____

Sample Number	From 0 to 9.76 Meters	Lithologic Description
	0 - 3.65	SAND; med.-fine, lt. brown-buff, moist w/fine gravel
		and random cobbles, becoming wet at approx. 2.13m BGL
	3.66 - 3.96	SAND; med.-fine, dk. brown-black, organic, moist
	3.96 - 7.32	SAND; med.-fine, lt. brown-buff, silty, well sorted,
		becoming very fine at approx. 4.57m, saturated at 5.18m
		BGL w/moderate silts
	7.32 - 9.15	SAND: med.-fine, brown, saturated w/fine gravel
	9.15 - 9.76	CLAY; lt. brown, very silty, plastic, moist from over-
		lying saturated zone
		topsoil material was removed
		bit sample of confining clay layer was taken upon
		confirmation w/client
		It is thought that clay layer at SB-1 is thin, due to
		split-spoon sample exhibited sand above and below clay
		retained in tube. Resulting in possible clay pene-
		tration. SB-1 was quickly grouted from 9.15m BGL to
		the surface. Split-spoon sample was disturbed and
		discarded.
		drilling was conducted w/4¼" I.D. augers
		bentonite slurry grouted from 0 - 9.15m BGL
		no well installed at this location
		Split-Spoon Sample Interval
		#1; 9.15 - 9.76 meters
		Blow Counts: 22, 28, 31
		GRID LOCATION 800 N/170 E
		GRD. ELEVATION 261.12m

Piezometer: ☐ Screen _____ Pipe _____ Total Depth (BGL) _____

JOB NUMBER 0178-439 DATE September 28th, 1983 PAGE

BORING NUMBER SB-2 (19 MONITOR WELL) TOTAL DEPTH 8.54m S.W.L. (BGL)

Sample Number	From 0 to 8.54 Meters	Lithologic Description
	0 - 1.52	SANDY LOAM; med.-fine, moist, dk. brown, silty
	1.52 - 2.13	COBBLES AND COARSE GRAVEL
	2.13 - 3.66	SAND: med.-fine, dry, reddish-brown w/minor pebbles
		and fine gravel
	3.66 - 4.88	SAND; med.-coarse, dk. brown, moist, poorly sorted w/
		fine gravel
	4.88 - 5.49	SAND; med.-fine, lt. brown-buff, moist, well sorted
	5.49 - 8.23	SAND: med.-fine, dk. brown, moist w/minor gravel, be-
		coming wet at approx. 6.10m, well sorted and saturated
		at 7.32m
	8.23 - 8.54	CLAY; gray, dense, dry, elastic
		bit sample of confining clay layer was taken upon
		confirmation w/client
		well installed at this location
		well T.D. = 8.54 meters BGL
		screened interval = 7.02 - 8.54 meters BGL
		bentonite slurry grouted from 1.52 - 7.02 meters BGL
		drilling was done w/6¼" I.D. augers
		materials: (1) 4" x 5' SSS #7 slot w/plug
		(1) 4" x 20' galvanized casing
		(1) 4" x 5' galvanized casing
		development remains to be completed
		GRID LOCATION 750 N/63 W
		GRD. ELEVATION 271.735m

Piezometer: ☐ Screen 1.52m Pipe 7.62m Total Depth (BGL)

JOB NUMBER 0178-439 DATE August 22, '85 PAGE

BORING NUMBER SB-3 drive well TOTAL DEPTH 13.1m S.W.L. (BGL)

Sample Number	From 0 to 13.1 Meters	Lithologic Description
	0 - .610	CLAY TILL; blackish-brown, very silty w/minor fine
		gravel & pebbles, moist
	.610 - 1.83	CLAY TILL; reddish-brown, moist w/large cobbles at
		random intervals
	1.83 - 3.66	SAND; med.-fine, reddish-brown, moist, well sorted
	3.66 - 12.5	SAND; med.-fine, lt. brown-buff, dry, becoming wet at
		5.79m, saturated at 6.71m, poorly sorted
	12.5 - 13.1	CLAY; reddish-brown, very silty, elastic, dense w/some
		moisture
		topsoil material was removed
		auger refusal in first location at 1.52m had to relocate
		well installed at this location
		well T.D. = 12.5 meters BGL
		screened interval = 10.98 - 12.5 meters BGL
		bentonite slurry grout from 6.71 - 10.98 meters BGL
		drilling was done w/6¼" I.D. Augers
		materials: (1) 4" x 5' SSS #10 slot w/plug
		(1) 4" x 20' galvanized casing
		(1) 4" x 18' galvanized casing
		development was done by air-jetting and well developed
		clear w/high recharge rate
		Split-Spoon Sample Interval
		#1; 12.5 - 13.11 meters
		Blow Counts: 24, 30, 31
		GRID LOCATION 382 N/63 W
		GRD. ELEVATION 270.685m

Piezometer: ☐ Screen 1.52m Pipe 11.5m Total Depth (BGL)

JOB NUMBER 0170-139 DATE August 23, '85 TEAM

BORING NUMBER SB-4 TOTAL DEPTH 6.71m S.W.L. (BGL)

Sample Number	From 0 to 6.71 Meters	Lithologic Description
	0 - .305	SANDY LOAM; blackish-brown, organic
	.305 - .915	CLAY TILL; reddish-brown, moist w/gravel & minor
		cobbles, silty
	.915 - 2.44	SAND; med.-fine, reddish-brown, moist, well sorted,
		silty
	2.44 - 6.40	SAND; med.-fine, dk. brown, poorly sorted w/some
		pebbles, moist, saturated at 3.96m, very silty and
		clayish in nature
	6.40 - 6.71	CLAY TILL; reddish-brown, very silty, elastic, moist
		and dense
		drilling was done w/6¼" I.D. augers
		no well installed at this location
		bentonite slurry grout from 0 - 6.71 meters BGL
		drilling T.D. = 6.71 meters BGL
		Note: due to nature of saturated material it was
		decided that a well at this location would be
		non-productive
		spoils sample of saturated material was taken
		GRID LOCATION 340 N/2 W
		GRD. ELEVATION 270.75m

Piezometer: ☐ Screen _____ Pipe _____ Total Depth (BGL) _____

BORING NUMBER SB-4A TOTAL DEPTH 7.01m S.W.L. (BGL) _____

Sample Number	From 0 to 7.01 Meters	Lithologic Description
	0 - .152	SANDY LOAM; blackish-brown, organic, moist
	.152 - .915	CLAY TILL; reddish-brown, moist w/med.-fine gravel,
		silty
	.915 - 1.22	COBBLES & COARSE GRAVEL
	1.22 - 1.83	SAND: med.-fine, moist, silty, reddish-brown
	1.83 - 4.27	SAND: med.-fine w/gravel, dk. brown, moist, becoming
		wet at approx. 2.13m, very silty
	4.27 - 6.10	CLAY TILL; reddish-brown, dense w/med.-fine sand,
		fine gravel and some cobbles
	6.10 - 7.01	CLAY: gray w/minor med.-fine sand, dry, very tight
		drilling w/auger refusal at 7.01m
		drilling done w/4¼" I.D. augers
		no well installed at this location
		auger refusal at .915m at two previous location and
		relocated three times before acquiring penetration
		through cobble zone
		backfilled w/natural materials
		drilling T.D. = 7.01 meters BGL
		location approximately 23 meters northwest of SB-4
		GRID LOCATION 376 N/14 W
		GRD. ELEVATION 270.80m

Piezometer: ☐ Screen _____ Pipe _____ Total Depth (BGL) _____

JOB NUMBER 0178-439 DATE August 25, 85 PAGE

BORING NUMBER SB-5 TOTAL DEPTH 10.1m S.W.L. (BGL)

Sample Number	From 0 to 10.1 Meters	Lithologic Description
	0 - .305	SANDY LOAM; blackish-brown, organic, moist
	.305 - 2.13	SAND; med.-fine, reddish-brown, very silty w/some minor
		cobbles & pebbles, minor gravel, dry, poorly sorted
	2.13 - 4.27	SAND; med.-fine, grayish-brown, very silty w/cobbles &
		pebbles, poorly sorted, moist
	4.27 - 7.32	CLAY TILL; dk. brown w/cobbles, dry, very silty, minor
		fine-med., poorly sorted sand
	7.32 - 9.15	SAND; med.-fine, lt. brown-buff, dry, silty, well
		sorted, saturated at approx, 8.53m
	9.15 - 10.1	CLAY; grayish-brown, silty, spoils are soupy in nature
		drilling done w/4¼" I.D. augers
		no well installed at this location
		attempted to spoon but refusal occurred due to cobbles
		from overlying lithology, client confirmed bit sample
		drilling T.D. = 10.1 meters BGL
		bentonite slurry grout from approx. 1.52 - 9.15 meters
		BGL and backfilled w/natural clay materials
		GRID LOCATION 127 N/80 E
		GRD. ELEVATION 271.545m

Piezometer: ☐ Screen _____ Pipe _____ Total Depth (BGL) _____

BORING NUMBER SB-6 TOTAL DEPTH 4.57m S.W.L. (BGL)

Sample Number	From 0 to 4.57 Meters	Lithologic Description
	0 - .304	SANDY LOAM; blackish-brown, organic
	.304 - .915	SAND; med.-fine, lt. brown, silty, saturated
	.915 - 1.52	CLAY; reddish-brown, dry, dense
	1.52 - 2.74	CLAY TILL; lt. brown, dry w/some med.-fine sand and fine gravel
	2.74 - 3.66	SAND; med.-fine, saturated, silty, lt. brown
	3.66 - 3.96	CLAY TILL; grayish-brown, moist w/med.-fine sand
	3.96 - 4.57	CLAY; gray, dry, sandy w/med.-fine sand, silty
		well installed this location
		drilling done w/4¼" I.D. augers
		drilling T.D. = 4.57 meters BGL
		well T.D. = 4.27 meters BGL
		due to poor potential of aquifer SB-6 was installed
		.609 meters into underlying clay to aquifer; optimum
		volume of water
		screened interval = 3.05 - 4.27 meters BGL
		backfilled w/natural materials from 0 - 2.74 meters BGL
		materials: (1) 4" x 4' SSS #10 slot w/plug
		(1) 4" x 13' galvanized casing
		devleopment; bail developed due to inadequate volume
		of water and slow recharge rate. SB-6 still reqires
		further bail development
		bit sample was taken from 3.96 - 4.57 meters BGL
		GRID LOCATION 130 N/310 E
		GRD. ELEVATION 273.95m

Piezometer: ☐ Screen 1.22m Pipe 3.96m Total Depth (BGL)

JOB NUMBER 0178-459 DATE September 5 1985 PAGE

BORING NUMBER SB-7 TOTAL DEPTH 5.18m S.W.L. (BGL)

Sample Number	From 0 to 5.18 Meters	Lithologic Description
	0 - .304	SANDY LOAM; blackish-brown, organic (removed w/loader)
	.304 - .915	SAND; fine-very fine, dry, lt. brown, silty
	.915 - 1.83	SAND; fine-very fine, reddish-brown, dry, well sorted,
		silty, wet at approx 1.83 ft.
	1.83 - 2.13	SAND; grayish-brown, very silty, med.-fine, moist
	2.13 - 3.66	CLAY TILL: grayish-brown, moist, very silty, plastic
		w/very fine sand and minor cobbles
	3.66 - 5.98	CLAY; gray, dry w/intermittent gravel zones
		drilling was done w/4¼" I.D. augers
		no well installed at this location
		drilling T.D. = 5.98 meters BGL
		bit sample taken from 4.87 - 5.18 meters BGL upon
		confirmation w/client
		backfilled w/natural materials and 1 bag bentonite
		GRID LOCATION 130 N/370 E
		GRD. ELEVATION 276.34m

Piezometer: ☐ Screen _____ Pipe _____ Total Depth (BGL) _____

JOB NUMBER 0178-439 DATE September 6, 1985 PAGE

BORING NUMBER SB-8 TOTAL DEPTH 15.2m S.W.L. (BGL)

Sample Number	From 0 to 15.2	Lithologic Description
	0 - .304	SANDY LOAM; dk. brown, organic
	.304 - .610	CLAY TILL; reddish-brown, elastic, moist, dense w/
		pebbles, fine gravel and sand
	.610 - 5.48	CLAY TILL; lt. brown, dry, plastic, silty w/minor
		pebbles and fine gravel, med.-coarse sand, cobble
		zone at 1.22 - 1.52 meters
	5.48 - 10.98	SAND; very fine, lt. brown, dry, very silty, becomes
		moist at 8.54 meters
	10.98 - 15.2	CLAY: gray, dense, dry, tight drilling
		drilling T.D. = 15.2 meters BGL
		drilling was done w/4¼" I.D. augers
		no well installed at this location
		bit sample was taken from 14.3 - 15.2 meters BGL
		bentonite slurry grout from .610 - 15.2 meters and
		backfilled w/natural materials
		GRID LOCATION 915 N/16 W
		GRD. ELEVATION 268.365m

Piezometer: ☐ Screen _____ Pipe _____ Total Depth (BGL) _____

BORING NUMBER SB-9 TOTAL DEPTH 10.8m S.W.L. (BGL) _____

Sample Number	From 0 to 10.8 Meters	Lithologic Description
	0 - .304	SANDY LOAM; blackish-brown, organic
	.304 - 1.52	SAND; med.-fine, grayish-brown, dry, becoming wet at
		1.22 meters
	1.52 - 3.96	SAND: med.-fine, reddish-brown, wet
	3.96 - 10.1	SAND AND GRAVEL; grayish-brown, saturated at 3.96m,
		med.-fine sand, well sorted
	10.1 - 10.8	CLAY; brown, dense, elastic, tight drilling
		drilling was done w/4¼" I.D. augers
		drilling T.D. = 10.8 meters BGL
		no well installed at this location
		bit sample was taken from 10.3 - 10.8 meters BGL
		backfilled w/natural materials w/1 bag of bentonite at
		the top of the water table
		GRID LOCATION 500 N/552 E
		GRD. ELEVATION 268.720m

Piezometer: ☐ Screen _____ Pipe _____ Total Depth (BGL) _____

JOB NUMBER 0178-439 DATE August 21, [illegible] PAGE

BORING NUMBER MW-70 TOTAL DEPTH 21.3m S.W.L. (BGL)

Sample Number	From 0 to 21.3 Meters	Lithologic Description
	0 - .305	SANDY LOAM; dk. brown, organic
	.305 - .610	SAND; med.-fine, lt. brown, dry, well sorted
	.610 - 2.44	SAND; med.-fine, reddish-brown, dry, well sorted,
		silty w/cobbles at 1.52m
	2.44 - 7.32	SAND; med.-fine, grayish-brown, moist, very silty w/
		cobbles
	7.32 - 20.1	SAND; med.-fine, lt. brown-buff, dry, poorly sorted w/
		some fine gravel, becoming moist at approx. 15.2m,
		saturation = 19.2m
	20.1 - 21.3	CLAY; gray, dense, tight drilling
		drilling T.D. = 21.3 meters BGL
		split-spoon sample of confining clay was taken
		screened interval = 19.1 - 20.1 meters BGL
		bentonite slurry grout from 10.1 - 19.2 meters BGL and
		backfilled w/natural materials and cement pad at
		surface
		materials: (1) 4" x 5.5' SSS #10 slot w/plug
		62.5' of 4" galvanized casing
		development by air jetting, clear w/high recharge rate
		Split-Spoon Interval
		#1; 20.7 - 21.3 meters
		Blow Counts: 27, 35, 40
		GRID LOCATION- 192 N/67 W
		GRD. ELEVATION 273.135m

Piezometer: ☐ Screen 1.68m Pipe 19.1m Total Depth (BGL)

JOB NUMBER 0178-439 DATE August 16, [illegible] PAGE

BORING NUMBER MW-71 TOTAL DEPTH 14.3m S.W.L. (BGL)

Sample Number	From 0 to 14.3 Meters	Lithologic Description
	0 - .305	SANDY LOAM; organic, blackish-brown
	.305 - 2.13	CLAY TILL; sandy, med.-fine, reddish-brown, very silty
		dry becoming moist at 1.83m w/intermittent cobbles &
		pebbles, significant cobbles at .610-.915m, drilling
		was tight
	2.13 - 4.57	CLAY TILL; sandy, med.-fine, grayish-brown, silty,
		moist w/cobbles at 4.57m
	4.57 - 7.62	COBBLES & GRAVEL; slow drilling, dry w/med.-coarse
		gravel, brown
	7.62 - 9.45	SAND: very fine-fine, lt. brown-buff, dry, poorly
		sorted & becoming silty at 9.15m, becoming wet at 8.84m,
		drilling was slow & tight due to frictional heat
	9.45 - 12.8	CLAY; gray, dense, plastic & dry, sandy at 9.45-10.7m,
		also some mottled clay at contact zone 9.45m, slow,
		tight drilling
	12.8 - 13.1	SAND & GRAVEL; dry, brown, med.-fine sand w/coarse
		gravel
	13.1 - 14.3	CLAY; gray, dense, dry & plastic
		bentonite slurry grout from 0 - 7.62 BGL and backfilled
		w/natural materials (clay) w/cement pad at surface
		initial boring (3.0m east of MW-71) was abandoned due
		to auger refusal at 7.62m BGL
		screened interval = 8.69 - 9.91 meters BGL
		inadequate water and slow recharge requires bail
		development
		gravel packed from 7.62 - 9.91 meters BGL
		slow & tight drilling created high frictional heat
		and condensation within the augers
		Note: standard penetration test - driving 2-inch O.D.
		sampler 0.61m with 140 lbs. hammer falling approx.
		0.76m; counts made at 6-inch intervals
		materials: (1) 4" x 4' SSS #10 slot w/plug
		32 ft. of 4-inch galvanized casing

Piezometer: ☐ Screen 1.22m Pipe 9.76m Total Depth (BGL)

con't...

JOB NUMBER 0178-45? DATE August 19, 1 ? TYPE

BORING NUMBER MW-71 con't. TOTAL DEPTH _____ S.W.L. (BGL) _____

Sample Number	From to Feet	Lithologic Description
		Split-Spoon Sample Intervals
		#1; 25 - 27 ft.
		#2; 47 - 49 ft.
		Blow Counts: #1; 16, 19, 20
		#2; 28, 35, 38
		GRID LOCATION 176 N/80 E
		GRD. ELEVATION 272.15m

Piezometer: ☐ Screen _____ Pipe _____ Total Depth (BGL) _____

JOB NUMBER 0178-439 DATE August 29, 1 PAGE

BORING NUMBER MW-73 (Boring) TOTAL DEPTH 11.3m S.W.L. (BGL)

Sample Number	From 0 to 11.3 Feet	Lithologic Description
	0 - .305	SANDY LOAM; dk. brown, organic, moist w/med.-fine sand
	.305 - .610	SAND; med.-fine, lt. brown, moist
	.610 - .915	SAND: med.-fine, reddish-brown, silty w/cobbles &
		pebbles
	.915 - 1.83	CLAY TILL; reddish-brown, dense, dry
	1.83 - 2.13	CLAY TILL; dk. brown, moist w/cobbles
	2.13 - 3.66	SAND & GRAVEL; med.-fine sand, med.-fine gravel w/
		pebbles, moist
	3.66 - 3.96	COBBLES; substantial, drilling .305m/hr.
	3.96 - 4.27	CLAY; color unknown, very tight drilling
	4.27 - 5.18	SAND AND GRAVEL; med.-fine sand, lt. brown, moist,
		med.-fine gravel, cobble zone at 5.18m
	5.18 - 11.3	CLAY; gray, dry w/some gravel & pebbles, slow drilling
		approx. .610m/hr., auger refusal at 11.3m
		drilling T.D. = 11.3 meters BGL
		auger refusal, abandon hole upon clients request; hole
		remains open for future boring by rotary, client
		confirmation obtained
		spoils sample of confining clay was taken from approx.
		7.62 - 9.15 meters BGL
		no well installed at this location
		GRID LOCATION- 170 N/545 E
		GRD. ELEVATION 276.98m

Piezometer: ☐ Screen _____ Pipe _____ Total Depth (BGL) _____

JOB NUMBER 0178-439 DATE September 3, 1985 PAGE

BORING NUMBER MW-74 TOTAL DEPTH 11.3m S.W.L. (BGL)

Sample Number	From 0 to 11.3 Meters	Lithologic Description
	0 - .610	CLAY TILL; back fill material
	.610 - 2.13	SAND; med.-coarse, lt. brown, moist, poorly sorted w/
		fine gravel and pebbles
	2.13 - 3.05	CLAY; lt. brown, moist, very silty
	3.05 - 10.7	SAND; med.-fine, lt. brown, saturated, poorly sorted,
		very silty, sand becomes med.-coarse w/gravel and
		pebbles mixed at approx. 4.88m
	10.7	CLAY; gray, dense, plastic, tight drilling w/high
		drilling pressure
		drilling T.D. = 10.7 meters BGL
		drilling w/6¼" I.D. augers
		screened interval = 5.49 - 7.01 meters BGL
		backfilled w/2 bags of bentonite at the top of water
		table and natural materials; cement pad at surface
		bit sample of confining layer taken upon request of
		client
		materials: (1) 4" x 5' SSS #7 slot w/plug
		20' of galvanized casing
		development by air jetting, clear w/high recharge rate
		Note: standard penetration test used in sampling
		Split-Spoon Sample Interval
		#1; 4.57 - 5.18 meters
		Blow Counts: 18, 23, 26
		MW-74 was installed at mid-aquifer-water at the
		request of client
		GRID LOCATION 391 N/600 E
		GRD. ELEVATION 267.81m

Piezometer: ☐ Screen 1.52m Pipe 6.08m Total Depth (BGL)

BORING NUMBER MW-74A TOTAL DEPTH 9.76m S.W.L. (BGL) _____

Sample Number	From 0 to 9.76 Feet	Lithologic Description
	0 - .305	SANDY LOAM; dk. brown, organic
	.305 - .915	CLAY TILL; dk. brown w/med.-fine sand, moist, very
		silty
	.915 - 1.52	SAND; med.-fine, lt. brown, moist, well sorted
	1.52 - 2.44	CLAY TILL; reddish-brown, moist, very silty w/pebbles
		and small cobbles
	2.44 - 9.15	CLAY; gray, dry, silty, plastic, dense, very tight
		drilling
		no well installed at this location
		auger refusal at 9.15 meters BGL, client called hole
		depth
		drilling T.D. = 9.15 meters BGL
		drilled w/6¼" I.D. augers
		backfilled w/natural materials
		Note: standard penetration test used in sampling
		Split-Spoon Sample Interval
		#1; 9.15 - 9.76 meters
		Blow Counts: 28, 36, 39
		GRID LOCATION 590 N/580 E
		GRD. ELEVATION 263.425

Piezometer: ☐ Screen _____ Pipe _____ Total Depth (BGL) _____

DES NUMBER 0178-439 DATE September 1985 PAGE

BORING NUMBER MW-74B TOTAL DEPTH 8.55m S.W.L. (BGL)

Sample Number	From 0 to 8.55 Meters	Lithologic Description
	0 - .305	SANDY LOAM; dk. brown, organic
	.305 - 1.83	SAND: med.-fine, lt. brown, wet, well sorted
	1.83 - 2.74	SAND; med.-fine, reddish-brown, wet
	2.74 - 3.66	SAND; med.-fine, grayish-brown, wet, well sorted
	3.66 - 8.23	SAND & GRAVEL; grayish-brown, saturated, poorly
		sorted, med.-coarse sand w/fine gravel
	8.23 - 8.55	CLAY; gray, dense & sandy w/med.-fine sand, tight
		drilling
		well T.D. = 5.49 meters BGL
		drilling T.D. = 8.55 meters BGL
		drilled w/4¼" I.D. augers w/intent of being only
		boring after establishing thickness of aquifer a well
		was requested by client at mid aquifer. MW-74B was
		pushed in upon consent of client
		screened interval = 3.96 - 5.49 meters BGL
		backfilled w/1 bag of bentonite at top of water table
		and natural materials w/cement pad at the surface
		bit sample taken from 8.23 - 8.54 meters
		materials: (1) 4" x 5' SSS #7 slot w/plug
		18' of 4" galvanized casing
		development by air jetting, clear w/high recharge rate
		GRID LOCATION 540 N/555 E
		GRD. ELEVATION 267.565m

Piezometer: ☐ Screen ____ Pipe ____ Total Depth (BGL) ____

JOB NUMBER 0178-459 DATE August 20, 19 PAGE

BORING NUMBER MW-75 WELL TOTAL DEPTH 5.49m S.W.L. (BGL)

Sample Number	From 0 to 5.49 Meters	Lithologic Description
	0 - .305	SANDY LOAM; blackish-brown, organic
	.305 - .610	SAND; med.-fine, dk. brown, saturated, well sorted
	.610 - 2.74	SAND; med.-fine, lt. brown, saturated, very silty w/
		gravel at 2.44m
	2.74 - 5.49	CLAY; gray, dense, dry, elastic
		drilling T.D. = 5.49 meters BGL, advancement into clay
		at 2.74 meters was upon request by client
		drilling w/6¼" I.D. augers
		well T.D. = 2.9 meters BGL
		screened interval = 1.4 - 2.9 meters BGL
		backfilled w/natural materials and 1 bag of bentonite
		at top of water table; cement pad at surface
		it became necessary to relocate three times due to
		auger refusal at .915 meters
		bit sample of confining clay taken
		materials: (1) 4" x 5' SSS #7 slot w/plug
		5.5' of 4" galvanized casing
		note: standard penetration test used in sampling
		development was by bailer due to slow recharge rate;
		initially water had to be induced to clear screened
		interval during air development; quality clear w/slow
		recharge rate
		Split-Spoon Sample Interval
		#1; 1.22 - 1.83 meters
		Blow Counts: 18, 25, 26
		GRID LOCATION 764 N/538 E
		GRD. ELEVATION 258.635m

Piezometer: ☐ Screen 1.52m Pipe 1.7m Total Depth (BGL)

BORING NUMBER MW-76 (Monitoring Well) TOTAL DEPTH 8.84m S.W.L. (BGL) _____

Sample Number	From 0 to 8.84 Meters	Lithologic Description
	0 - .305	SANDY LOAM; dk. brown, moist w/med.-fine sand, organic
	.305 - .915	SAND; med.-coarse, dk. brown, moist, well sorted
	.915 - 8.23	SAND & GRAVEL; brown, silty, saturated, med.-fine sand
		w/some fine gravel
	8.23	CLAY; gray w/very silty fine sand interbeds
		drilling T.D. = 8.23 meters BGL
		screened interval = 5.49 - 7.16 meters BGL
		well T.D.= 7.16 meters BGL
		backfilled w/natural materials and 1 bag of bentonite
		at water table; cement pad at surface
		drilled w/6¼" I.D. augers
		materials: (1) 4" x 5.5' SSS #10 slot w/plug
		20' of 4" galvanized casing
		development was by air jetting; water quality clear
		and having a high recharge rate
		Note: standard penetration test used in sampling
		Split Spoon Sample Intervals
		#1; 3.05 - 3.66 meters
		#2; 8.23 - 8.84 meters
		Blow Counts: #1; 16, 21, 29
		#2; 28, 30, 35
		GRID LOCATION - 900 N/539 E
		GRD. ELEVATION 254.47m

Piezometer: ☐ Screen 1.68m Pipe 6.09m Total Depth (BGL) _____

JOB NUMBER 0178-439 DATE August 27, 19[illegible] PAGE

BORING NUMBER MW-77 TOTAL DEPTH 21.9m S.W.L. (BGL)

Sample Number	From 0 to 21.9 Meters	Lithologic Description
	0 - .610	CLAY TILL; dk. brown w/large cobbles, moist
	.610 - 1.52	SAND; med.-fine, reddish-brown, dry w/cobbles, poorly
		sorted
	1.52 - 1.82	SAND; med.-fine, dk. brown, moist w/cobbles
	1.82 - 6.4	SAND; fine, lt. brown-buff, well sorted, moist,
		angular
	6.4 - 7.9	CLAY; unidentified (no spoils) tight drilling, dense
	7.9 - 11.3	SAND; med.-fine, lt. brown, poorly sorted, moist
	11.3 - 12.5	CLAY; unidentified, dense, tight
	12.5 - 21.3	SAND: med.-fine, lt. brown, wet, saturated at approx.
		13.7m, well sorted
	21.3	CLAY; gray, tight
		drilled w/6¼" I.D. augers
		drilling T.D. = 21.3 meters BGL
		well T.D. = 18.6 meters BGL
		screened interval = 17.1 - 18.6 meters BGL
		bentonite slurry grout from 6.1 - 18.2 meters BGL
		MW-77 was installed at an mid-aquifer level at the
		the request of client
		split spooned confining clay layer but no retrieval
		was obtained so a bit sample was taken
		development by air jetting, clear w/high recharge rate
		materials: (1) 4" x 5' SSS #7 slot w/plug
		58' of 4" galvanized casing
		Note: standard penetration test used in sampling
		Split-Spoon Sample Intervals
		#1; 10.7 - 11.3 meters
		#2; 21.3 - 21.9 meters
		Blow Counts: #1; 24, 27, 28
		#2; 27, 31, 36
		GRID LOCATION 810 N/218 E
		GRD. ELEVATION 268.71m

Piezometer: ☐ Screen _____ Pipe _____ Total Depth (BGL) _____

[redacted]

F

APPENDIX F

WELL LOGS OF THE AREA OF THE SITE

G

APPENDIX G

MDNR SURFACE WATER SAMPLING DATA

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

GORDON E. GUYER, Director

State Office Building
350 Ottawa, N.W.
Grand Rapids, Michigan 49503
Phone: (616) 456-5071

April 26, 1988

Mr. Steve Bunson
Ecology and Environment
111 West Jackson Boulevard
Chicago, Illinois 60604

RE: 10 Mile Landfill Sampling Results - Kent County, Michigan

Dear Mr. Bunson:

As requested, I have enclosed analytical results from samples taken from surface waters associated with the 10 Mile Landfill. Sampling results labeled 04, 05, and 06 are from under-drain outfalls at the landfill site. The sample labeled 131 was taken from the receiving stream approximately one half mile from the landfill site immediately upstream of the U.S. 131 crossing. The sample labeled BG is a background sample taken from a tributary to the receiving stream near the U.S. 131 crossing. Finally, the sampling results labeled Jewell were from the receiving stream at Jewell Avenue near the confluence of the receiving stream with the Rogue River.

Should you have any additional comments or questions regarding these sampling results, please feel free to contact me at the above number.

Sincerely,

Ronald K. Woods

Ronald K. Woods, P.E.
Environmental Engineer
Surface Water Quality Division

RKW/kad

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY

RECEIVED

APR 26 1988

SURFACE WATER QUALITY DIV.
GRAND RAPIDS

REPORT Surface Water Quality Div.
TO 350 Ottawa NW
6th Floor
Grand Rapids, MI 49503
ATTEN RON WOODS

LABORATORY WORK ORDER # 88-02-057
WORK ID 10 MILE LANDFILL
P.O. # 3801-820 COST $ 1215.00
RECEIVED 02/18/88 CLIENT SWQ GR
REPORTED _____ NUMBER OF SAMPLES 6
LAB CONTACT BN JP RW MATRIX WATER

TEST	UNITS	04	05	06	131
BOD 5 Day Carb	mg/l	3	48	21	K 2
BOD 5 Day Total	mg/l	3	47	17	K 2
Cadmium in Water	ug/l	K 20	K 20	K 20	K 20
Chloride in Water	mg/l	73	42	33	38
Chromium in Water	ug/l	K 50	K 50	K 50	K 50
Copper in Water	ug/l	K 20	K 20	K 20	K 20
Dissolved Oxygen	mg/l	8.1	6.1	5.5	12.4
Iron in Water	ug/l	1510	12600	3300	600
Nickel in Water	ug/l	K 50	K 50	K 50	K 50
Nitrite	mg N/l	K .01	.09 DM	.04 DM	K .01
Nitrate + Nitrite	mg N/l	K 0.1 HT	.06 HT	.05 HT	.20 HT
Ammonia	mg N/l	6.6 HT	.84 HT	.33 HT	.07 HT
Lead in Water	ug/l	K 50	K 50	K 50	K 50
Ortho Phosphate	mg P/l	K .01	K .01 DM	.01 DM	K .01
Total Phosphorus	mg P/l	.022	.011	.023	.025
Total Dissolved Solids	mg/l	710	600	480	400
TOC	mg/l	6.1	26	12	2.4
Zinc in Water	ug/l	K 50	K 50	K 50	K 50

Received: 02/18/88 04/21/88 23:20:47

TEST / UNITS	B6	JEWELL
BOD 5 Day Carb mg/l	K 2	K 2
BOD 5 Day Total mg/l	K 2	K 2
Cadmium in Water ug/l	K 20	K 20
Chloride in Water mg/l	51	48
Chromium in Water ug/l	K 50	K 50
Copper in Water ug/l	K 20	K 20
Dissolved Oxygen mg/l	11.2	12.5
Iron in Water ug/l	290	290
Nickel in Water ug/l	K 50	K 50
Nitrite mg N/l	K .01	K .01
Nitrate + Nitrite mg N/l	1.6 HT	1.1 HT
Ammonia mg N/l	.03 HT	.03 HT
Lead in Water ug/l	K 50	K 50
Ortho Phosphate mg P/l	K .01	K .01
Total Phosphorus mg P/l	.012 NH	.028
Total Dissolved Solids mg/l	330	340
TOC mg/l	2.3	2.2
Zinc in Water ug/l	K 50	K 50

Report prepared By: D. Hartig 4-22-88

SAMPLE ID 04 FRACTION 01D TEST CODE SC 1 NAME Scan 1 Water
Date & Time Collected 02/17/88 10:45:00 Category

ANALYST KAJIYA
ANALYZED 03/01/88
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromomethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	7.9		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	44	DL	1.0
156-59-2	cis-1,2-Dichloroethene	6.2		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	13		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	1.9		1.0
78-87-5	*1,2-Dichloropropane	ND		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS

ND = not detected at the specified detection limit.
* Compound identity not confirmed by second independent technique.

SAMPLE ID 04 FRACTION 01D TEST CODE SC 2 NAME Scan 2 Water
Date & Time Collected 02/17/88 10:45:00 Category

ANALYST KAJIYA
ANALYZED 03/01/88
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene	ND		1.0
108-88-3	Toluene	4.7		1.0
100-41-4	Ethylbenzene	4.0		1.0
108-38-3	Xylene isomers	5.9		1.0

COMMENTS UnID PEAK

ND = not detected at the specified detection limit.

Received: 02/18/88 Results by Sample

SAMPLE ID 05 FRACTION 02D TEST CODE SC 1 NAME Scan 1 Water
Date & Time Collected 02/17/88 10:45:00 Category

ANALYST KAJIYA
ANALYZED 03/01/88
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	5.5		5.0
74-83-9	*Bromomethane	ND		5.0
75-00-3	*Chloroethane	7.6		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	29		1.0
156-59-2	cis-1,2-Dichloroethene	24		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	1.8		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	18		1.0
79-01-6	Trichloroethene	2.1		1.0
78-87-5	*1,2-Dichloropropane	1.1		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	1.9		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS

ND = not detected at the specified detection limit.
* Compound identity not confirmed by second independent technique.

SAMPLE ID 05 FRACTION 02D TEST CODE SC 2 NAME Scan 2 Water
Date & Time Collected 02/17/88 10:45:00 Category

ANALYST KAJIYA
ANALYZED 03/02/88
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene	16		5.0
108-88-3	Toluene	320		5.0
100-41-4	Ethylbenzene	120		5.0
108-38-3	Xylene isomers	270		5.0

COMMENTS UnID PEAKS

ND = not detected at the specified detection limit.

SAMPLE ID 06 FRACTION 03D TEST CODE SC 1 NAME Scan 1 Water
Date & Time Collected 02/17/88 10:45:00 Category

ANALYST KAJIYA
ANALYZED 03/02/88
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromomethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	1.2		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	ND		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	1.9		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	*1,2-Dichloropropane	ND		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS

ND = not detected at the specified detection limit.
* Compound identity not confirmed by second independent technique.

SAMPLE ID 06 FRACTION 03D TEST CODE SC 2 NAME Scan 2 Water
Date & Time Collected 02/17/88 10:45:00 Category

ANALYST KAJIYA
ANALYZED 03/02/88
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene	ND		1.0
108-88-3	Toluene	14		1.0
100-41-4	Ethylbenzene	5.1		1.0
108-38-3	Xylene isomers	15		1.0

COMMENTS

ND = not detected at the specified detection limit.

SAMPLE ID 131 FRACTION 04D TEST CODE SC 1 NAME Scan 1 Water
Date & Time Collected 02/17/88 10:45:00 Category

ANALYST KAJIYA
ANALYZED 03/02/88
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromomethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	ND		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	ND		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	*1,2-Dichloropropane	ND		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS

ND = not detected at the specified detection limit.
* Compound identity not confirmed by second independent technique.

SAMPLE ID 131 FRACTION 04D TEST CODE SC 2 NAME Scan 2 Water
Date & Time Collected 02/17/88 10:45:00 Category

ANALYST KAJIYA
ANALYZED 03/02/88
DILUTION 1 UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene	ND		1.0
108-88-3	Toluene	ND		1.0
100-41-4	Ethylbenzene	ND		1.0
108-38-3	Xylene isomers	ND		1.0

COMMENTS

ND = not detected at the specified detection limit.

SAMPLE ID B6 FRACTION 05D TEST CODE SC 1 NAME Scan 1 Water
Date & Time Collected 02/17/88 10:45:00 Category

ANALYST KAJIYA
ANALYZED 03/02/88
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromomethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	ND		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	ND		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	*1,2-Dichloropropane	ND		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS

ND = not detected at the specified detection limit.
* Compound identity not confirmed by second independent technique.

SAMPLE ID 86 FRACTION 05D TEST CODE SC 2 NAME Scan 2 Water
Date & Time Collected 02/17/88 10:45:00 Category

ANALYST KAJIYA
ANALYZED 03/02/88
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene	ND		1.0
108-88-3	Toluene	ND		1.0
100-41-4	Ethylbenzene	ND		1.0
108-38-3	Xylene isomers	ND		1.0

COMMENTS

ND = not detected at the specified detection limit.

SAMPLE ID JEWELL FRACTION 06D TEST CODE SC 1 NAME Scan 1 Water
Date & Time Collected 02/17/88 10:45:00 Category

ANALYST KAJIYA
ANALYZED 03/02/88
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromomethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	ND		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	ND		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	*1,2-Dichloropropane	ND		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS

ND = not detected at the specified detection limit.
* Compound identity not confirmed by second independent technique.

SAMPLE ID JEWELL FRACTION 06D TEST CODE SC 2 NAME Scan 2 Water
Date & Time Collected 02/17/88 10:45:00 Category

ANALYST KAJIYA
ANALYZED 03/02/88
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene	ND		1.0
108-88-3	Toluene	ND		1.0
100-41-4	Ethylbenzene	ND		1.0
108-38-3	Xylene isomers	ND		1.0

COMMENTS

ND = not detected at the specified detection limit.